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THESIS

**COMPARATIVE ANALYSIS OF EMERGENCY
RESPONSE OPERATIONS: HAITI EARTHQUAKE IN
JANUARY 2010 AND PAKISTAN'S FLOOD IN 2010**

by

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September 2011

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HAITI EARTHQUAKE IN JANUARY 2010 AND PAKISTAN'S FLOOD IN 2010**

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ABSTRACT

This study explores HA/DR operations and the associated response of the international community during the recent earthquake in Haiti and flood in Pakistan in 2010. A powerful earthquake of magnitude 7.0 hit Haiti on January 12, causing great damage and mass casualties. The international community responded swiftly and took over relief efforts in the country saving a lot of lives. Handsome donations were also given and committed. Pakistan suffered heavy floods that started in the end of July 2010 and affected nearly the entire country. Loss of life was not very great, but infrastructure damage and people subsequently affected surpassed the combined total of the 2004 Tsunami, Haiti earthquake and 2005 South Asia earthquake. During this disaster the international community, particularly volunteer technologists, were not mobilized the way they were in Haiti. Donations were made late and comparatively slow. No single country can handle a large-scale natural disaster like the two exemplar cases chosen for this thesis, and hence the role of the international community is very important. Such response has not been equitable in the past and it is the goal of this research to find ways to make it more equitable in the future.

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LIST OF ACRONYMS AND ABBREVIATIONS

ADP	Asian Development Bank
AJ&K	Azad Jammu and Kashmir
AMC	Army Medical Corp
APAN	All Partners Access Network
API	Application Programmers Initiative
ARI	Acute Respiratory Infections
CARICOM	Caribbean Community
CC	Country Coordinator at UNO
CERF	Central Emergency Response Fund
CFC	Civil Military Fusion Center
CGI	Compacted Graphite Iron
CIW	Commissioner for Indus Water
CMCoord	Civil Military Coordination
CMH	Combined Military Hospitals
CMO	Civil Military Overview
DART	Disaster Assistance Response Team
DDMA _s	District Disaster Management Authorities
DHS	Department of Homeland Security
DMA	Disaster Management Authority
DNA	Damage Needs Assessment
DOD	United States Department of Defense
DPC	Departement de Protection Civile
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
D2D	Donor2Deed
E	East
EPI	Expanded Program of Immunization
ERC	Emergency Relief Cell
ERRA	Earthquake Relief and Rehabilitation Authority
ERRF	Emergency Recovery and Reconciliation Fund

FAO	Food and Agriculture Organization
FCSS	Field Coordination Support Section
FEMA	Federal Emergency Management Agency
FFC	Federal Flood Commission
FFD	Flood Forecasting Division
FRC	Federal Relief Commission
GB	Gilgit Baltistan
GCI	Global Competitive Index
GDACS	Global Disaster Alert Coordination System
GDP	Gross Domestic Product
GNI	Gross National Income
GoP	Government of Pakistan
GPI	Global Peace Index
GPS	Global Positioning System
GWAT	Global War Against Terrorism
HA/DR	Humanitarian Assistance and Disaster Relief
HDR	Human Development Report
HELP	Haitian Economic Lift Act
HIPC	Highly Indebted Poor Country
HOPE	Hemispheric Opportunity through Partnership Encouragement
IASC	Inter Agency Standing Committee
IC	United States Intelligence Community
ICT	Information Communication Technology
ICoord	Inland Coordinator
ICRC	International Committee of the Red Cross
IFRC	International Federation of the Red Cross
IGC	International Growth Centre
IKF	Imran Khan Foundation
INGOs	International Nongovernmental Organizations
IOM	International Organization for Migration
JOTC	Joint Operations Tasking Centre
JWICS	Joint Worldwide Intelligence Communications System
KM	Knowledge Managers

Km	Kilometer
KPK	Khyber Pakhtunkhwa
LUMS	Lahore University of Management Sciences
MASH	Mobile Army Surgical hospital
MIF	Multinational Interim Force
MINUSTAH	UN Stabilization Mission in Haiti
MoFA	Ministry of Foreign Affairs
MoH	Ministry of Health
MREs	Ready to eat meals
MSF	Manufacturing, Science, Finance (a trade union)
MW	Megawatt
MYR	Mid Year Review
N	North
NADRA	National Database and Registration Authority
NATO	North Atlantic Treaty Organization
NDMA	National Disaster and Management Authority
NDMC	National Disaster Management Commission
NGO	Non Governmental Organization
NLC	National Logistic Cell
NRF	NATO Response Force
NWFP	North West Frontier Province
OAS	Organization of American States
OCHA	Coordination of Humanitarian Affairs
OFDA	Office of Foreign Disaster Assistance
OHCHR	Office of the High Commissioner for Human Rights
OSINT	Open Source Intelligence
PAF	Pakistan Air Force
PAHO	Pan American Health Organization
PDMA _s	Provincial Disaster Management Authorities
PIDA	Provincial Irrigation and Drainage Authority
PKR	Pakistani Rupees
PML (N)	Pakistan Muslim League (Nawaz)
PPP	Pakistan People's Party
PRC	People's Republic of China

PTCL	Pakistan Tele Communication Authority
RIT	Rochester Institute of Technology
RM/A	Relief Manager/Auditor
SCO	Special Communications Organization
SEABEES	Members of the U.S. Navy's Construction Battalions (from pronunciation of CB, for Construction Battalion)
SIPRNet	Secret Internet Protocol Router Network
SMS	Short Message Service
SOUTHCOM	U.S. Southern Command
SRSG	Special Representative to the Secretary General
SUPARCO	Space and Upper Atmosphere Research Commission
UN	United Nations
UNO	United Nations Organization
UNDAC	Disaster Assessment and Coordination
UNDP	United Nations Development Programme
UNFPA	United Nation Population Fund
UNHAS	United Nations Humanitarian Air Services
UNHRD	United Nations Humanitarian Response Depot
UNICEF	UN Children's Fund
UNSC	UN Security Council
USAID	U.S. Agency for International Development
USC	Utility Stores Corporation
USGS	United States Geological Survey
U.S.S.	United States Ship
VOSOCC	Virtual Onsite Operations and Coordination Center
WAPDA	Water and Power Development Authority
WB	World Bank
WFP	World Food Program
WHO	World Health Organization
3W	Who is Doing What Where

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I. INTRODUCTION

Hazards such as flood, cyclone and earthquake are natural. But disasters are not natural: they claim the highest mortality and impose the harshest cost on the poorest nations.¹

A. FOREWORD

As per the International Disaster Database, there has been a steady increase in the frequency of natural disasters during past thirty five years, with almost as many occurring in past five years as in the whole of the previous decade. Average disasters per year between 1994 and 1998 were 428, which jumped to the annual average of 707 between 1999 and 2003.

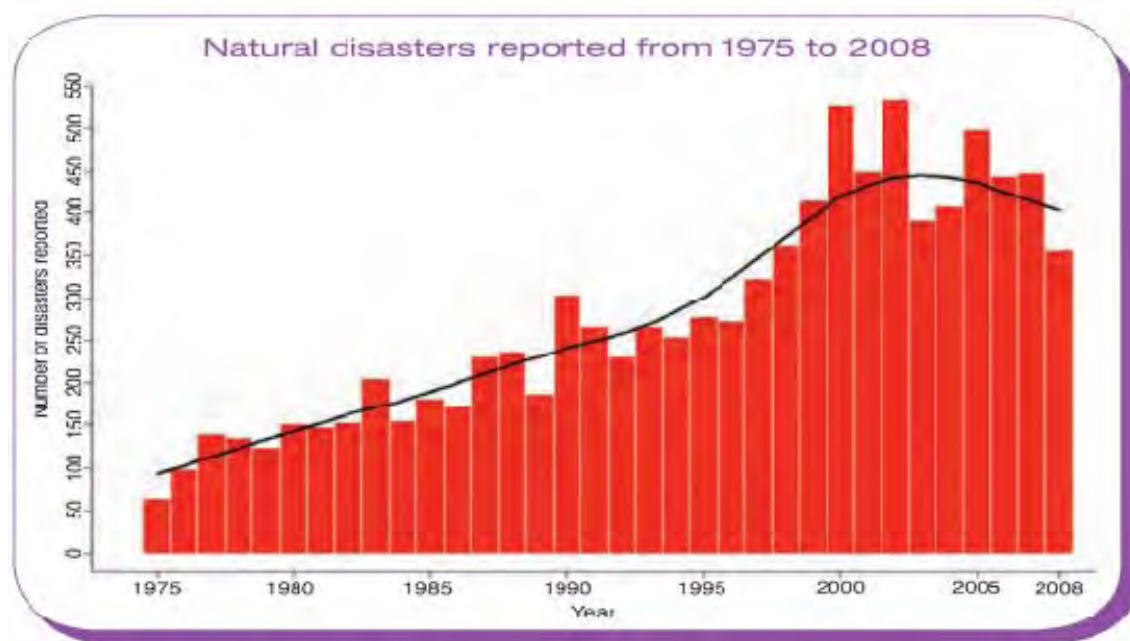


Figure 1. Natural Disasters Reported from 1975 to 2008²

¹ "Disasters and development: After the floods," editorial, no author, *The Guardian*, 23 August 2010. Accessed 31 January 2011. Available <http://www.guardian.co.uk/commentisfree/2010/aug/23/pakistan-floods-planning>.

² Ibid.

This increasing trend is shown in most categories of disasters, including hurricanes, floods, and earthquakes. People in the poorest countries are the most affected due to poor housing quality, inadequate levels of infrastructure and weak emergency services.³

In 2010, the world suffered many natural disasters, but two among these may be considered among the worst in the history of mankind due to either lives lost or population affected. As soon the year started, a great earthquake of magnitude 7.0 hit Haiti at 04:53:10 PM on January 12, 2010; its epicenter was 25 km (8.1 miles) from Port Au Prince, the capital city of Haiti.⁴ The earthquake killed more than 230,000 people, injured hundreds of thousands more, and the country suffered great infrastructure loss. The government also lost thousands of its civil servants and was in a very difficult situation for conducting relief operations as well as other business of the governance. The government was already facing difficulties with the issues of security and poor economic conditions and it was not possible for it to conduct the relief efforts with its own resources. However, after the earthquake, the international community responded swiftly and hundreds of relief workers reached the country to help in rescue operations, and thousands of tons of relief goods were received. Donations in the form of cash were also significant from countries, as well as from the public sector of different nations, particularly from U.S. citizens. During this disaster a new volunteer group of information and communication technologists emerged, which played a great role in relief operations.

In the later part of the year, Pakistan was struck by the worst flood in its history. The flooding began on July 29, 2010 due to heavy rains and snow melting in the northern part of the country.⁵ The flood first hit the Khyber Pakhtunkhwa (KPK) province, which is the northern part of the country, and killed around 1,156 people (the most in any

³ Diane Coyle and Patrick Meler, "New Technologies in Emergencies and Conflicts: The Role of Information and Social Networks," Accessed 31 March 2011. Available http://www.globalproblems-global solutions-files.org/pdf/UNF_tech/emergency_tech_report2009/Tech_EmergencyTechReport_full.pdf p.4.

⁴ USGS, No Author. Accessed 24 March 2011. Available <http://earthquake.usgs.gov/earthquakes/recenteqsww/Quakes/us2010rja6.php>.

⁵ U.S. Department of State, "Update: U.S. Response to Pakistan's Flooding Disaster," No Author, August 9, 2010. Accessed 5 January 2011. Available <http://www.state.gov/r/pa/prs/ps/2010/08/145814.htm>.

province) and injured around 1,198 more.⁶ As the water kept moving south, rivers overflowed their banks and flooded thousands of villages, towns and dozens of cities and caused further casualties, injuries and great infrastructure damages such as bridges, roads, hospitals, government buildings and houses, etc. More than two million people became homeless, hundreds of thousands of livestock were killed, whole crops for the season were swept away, and more than one fifth of the country was submerged. This situation added to the miseries of the country, which was already struggling due to militancy and poor economic conditions. A disaster of this size and scope clearly required the support of the international community to provide humanitarian relief.

Comparisons between the international community's response to the Haitian earthquake and to Pakistan's floods can perhaps provide grounds for comparing and analyzing Humanitarian Assistance and Disaster Relief (HA/DR) efforts as these major tragedies occurred within seven months of each other. The main focus of this study is to identify and explore possible reasons for the disproportionate response from the international community to the two disasters. Although these are different types of disasters, there are some similarities and differences between the two cases that deserve attention.

B. COMPARING EARTHQUAKES AND FLOODS

Between the years 2000 and 2009, around two billion people were affected by disasters throughout the world. Out of those, 44% were affected by floods, 30% by drought, and only 4% by earthquakes. However, 60% of those killed in disasters died in earthquakes. In comparison with flooding, earthquakes pose particular difficulties:⁷

- Risk of aftershocks following a major earthquake traumatizes population, poses threat to the life of relief workers and complicates relief efforts.

⁶ NDMA Pakistan, "Pakistan Floods-Summary of Damages," No Author. Accessed 24 March 2011. Available <http://www.pakistanfloods.pk/en/damage/summary-of-damages/damages>.

⁷ Active Learning Network for Accountability and Performance in Humanitarian Action (ALNAP), "Responding to earthquakes 2008 - Learning from earthquake relief and recovery operations," No Author. July 2008. Accessed 24 March 2011. Available <http://www.alnap.org/pool/files/ALNAPLessonsEarthquakes.pdf>.

- Earthquake leads to damaged infrastructure, collapsed buildings and large amounts of rubble, which need to be moved for relief efforts.
- Large numbers of injuries in contrast to flooding where people either die by drowning or escape largely unscathed. Earthquake injuries tend to be particularly serious such as spinal cord injuries, crushed limbs that require both immediate care and longer term rehabilitation.
- Difficulties in mobilizing support to reduce future risks, as earthquakes are less likely to occur than other disasters.
- The effects in case of a major earthquake are generally concentrated as compared to other natural disasters, such as floods, which normally cover a huge area.
- Collapsing buildings may kill large numbers of people, whereas in case of floods or other disasters due to early warning people may be evacuated and casualties may be reduced. Thus, earthquakes cause high mortality than other disasters.
- Earthquakes pose low risk of epidemics whereas outbreak of an epidemic especially cholera and diarrhea following a flood is generally more common.
- There is no gap or stability phase between relief and recovery as earthquake may hit with refugee emergencies or similar complex emergencies. Households begin their recovery efforts immediately after the earthquake.

Most obviously, earthquakes occur suddenly and with little or no warning. People cannot be evacuated in advance of an earthquake and efforts to mitigate the risks of earthquakes generally focus on making buildings safer by implementing strict building code and educating the population on how to respond when the tremor strikes; both of these measures need preparation far in advance before the tremor actually struck. In contrast, while flooding can occur suddenly after a particularly heavy rain or the collapse

of a dam, large scale flooding is usually the result of sustained heavy rains over a period of time, which causes rivers to swell and overflow their banks. This is what happened in Pakistan.⁸

Earthquakes can occur in rural as well as urban areas, but the damage is greater in urban areas because of greater number and large size of the buildings, which can collapse, and also because of the concentration of the population. Flooding caused due to heavy rains is often paralleled by mudslides. Large scale flooding tends to have more of an impact on agriculture and livestock than major earthquakes. Major earthquakes certainly disrupt agricultural production by damaging transportation and economic infrastructures. Flooding can destroy crops as well as equipment and seeds. Even when flood waters subside, the land may be unfit for agricultural production for a long period of time. Livestock is a particularly valued resource in rural communities and livestock is almost always lost when there is major flooding.⁹

Following an earthquake or wide scale flooding, different resources are needed to rescue people from imminent danger. In case of earthquakes, the immediate challenge is to find survivors buried under rubble, while in large scale flooding the need is to evacuate people from rooftops, trees, and other places that provide protection from the rising water. Earthquakes require heavy equipment to remove debris and conduct search and rescue work, while flooding requires helicopters and boats to evacuate people and provide relief goods to stranded people. In a major disaster the capacity of national authorities to meet these needs is overwhelmed and therefore equipment and specialized teams must be brought in from outside the country, which always takes a lot of time. In the Haitian earthquake, most of the people pulled alive from the rubble were rescued by family, neighbors and the community. By the time the international community reached for help (sixty seven search and rescue teams) and in spite of their heroic efforts, the lives

⁸ Elizabeth Ferris, "Earthquakes and Floods: Comparing Haiti and Pakistan." Accessed 24 March 2011. Available http://www.brookings.edu/~media/Files/rc/papers/2010/0826_earthquakes_floods_ferris/0826_earthquakes_floods_ferris.pdf.

⁹ Ibid.

saved numbered only 132.¹⁰ Even in the case of Pakistan, many of those who escaped the flooding did so at their own without transport or support from either the Pakistani authorities or the international community.

Access by humanitarian workers to people in need is almost always a difficult issue in natural disaster response because of the damaged transportation infrastructure. In both Haiti and Pakistan, access has been slow. In Haiti this was largely because of huge amount of rubble and the destruction of roads; in Pakistan it was primarily because much of countryside was underwater and roads and bridges were washed out. At a time when people need food and water, there simply isn't time to rebuild the infrastructure to facilitate the movement of equipment and supplies.¹¹

In all major disasters affected communities not only have material needs for life saving assistance (food, water, water and sanitation, shelter, medical care), but also often face protection or security needs. In the case of Haiti, the problems of separated children, human trafficking, sexual and gender based violence and overall violence in the camps continued to be serious issues even seven months after the earthquake. Pakistan was faced with the issue of separated children, discrimination by caste in provision of assistance, and of gender based violence.¹² Table 1 shows a comparison of deaths, injuries and damages caused by some of the important natural disasters in the recent past.¹³

¹⁰ USA Today, "U.N.: Haiti calls off search and rescue," No Author, Staff and Wire reports, 23 January 2010. Accessed 24 March 2011. Available http://www.usatoday.com/news/world/2010-01-23-haiti-saturday_N.htm.

¹¹ Ferris, "Earthquakes and Floods."

¹² Ibid.

¹³ NDMA Pakistan, "Important Disasters- Comparative Statement," No Author. Accessed 27 March 2011. Available http://www.ndma.gov.pk/Documents/flood_2010/flood_comparison.pdf.

	Pakistan Flood (August 2010)	Earthquake Pakistan (Oct 2005)	Katrina Cyclone USA (Aug 2005)	Nargis Cyclone Myanmar (May 2008)	Tsunami Indian Ocean Basin (Dec 2004)	Haiti Earthquake (Jan 2010)
Population Affected	*20,251,550	3,500,000	500,000	2,420,000	2,273,723	3,200,000
Area Affected (Sq Km)	*132,000	30,000	N.A.	23,500	N.A.	13,226
Deaths	*1,767	73,338	1,836	84,537	238,000	230,000
Injured	*2,865	128,309	N.A.	19,359	125,000	300,000
House Hold Damaged	*1,884,708	600,152	200,000	450,000	N.A.	250,000

*Information based on initial assessment

Table 1. Important Disasters—Comparative Statement

C. METHODOLOGY

The research involves a comparative analysis of the Haiti earthquake and the Pakistan floods that occurred in 2010. The variables for comparative analysis of emergency response operations by the international community were selected and each variable was assigned a weighting score 'N' according to its influence and significance on the response by the international community to a major disaster. The effect of each variable on the response shown by the international community in our two exemplar cases (i.e., earthquake in Haiti and floods in Pakistan in 2010) was determined. The country, which had better response by the international community under the influence of a particular variable will be assigned the value 'N+N/2' and the other 'N-N/2.' The values assigned to each variable for both the countries will be used to determine the cumulative response by the international community in each country, which will lead to a determination as to whether the response in both the exemplar cases was equitable or not. If not, the reasons for this difference are explored. Recommendations to improve the international community's response to major disasters and to make it equitable for all nations are provided.

The following variables are used for comparative analysis of response shown by the international community in our two exemplar cases:

1. Pre-existing Conditions in the Country:
 - a. Overall political and economic conditions
 - b. State of the military forces or trained human resources available for rescue and relief works
 - c. Geographical location and level of engagement with the international community
2. Media Attention
3. Nature of the disaster
4. Temporal factor

D. SCOPE

The scope of this comparative study will be to analyze the difference in the nature of response from the international community in the cases of the Haiti earthquake and Pakistan's flood that occurred in 2010. Both countries are very different in nature and location, and the nature of the disaster was also different in each case, but the response from the international community in both situations provide sufficient grounds for comparative analyses given the large degree of commonality for HA/DR operations in general.

E. PURPOSE

The outcome of this study will help to improve the disaster response of the international community by determining ways for more equitably provided disaster relief that is good for the international community.

F. THESIS STRUCTURE

This thesis is divided into six chapters. Chapter I introduces the subject, defines the structure of this thesis, the methodology that will be employed, and exact scope and purpose of the thesis. Chapter II will explain the nature of the disaster of the earthquake in Haiti in 2010 and will present the facts of the event and the response from within the country and the international community. This chapter will also shed some light on

hurricane Tomas, which hit Haiti in 2010 and the nature of response by the international community to that event. This chapter will also introduce the modern tools that were used by relief organizations during the earthquake relief operations. Chapter III will explain the facts and historical background of the floods in Pakistan in 2010 and will also highlight the nature of response shown from within the country and by the international community. The 2005 earthquake in Pakistan will also be discussed in terms of its nature of damage and nature of response it received from within the country and from the international community. This chapter will also introduce what modern tools were used by relief organizations during the flood relief operations in 2010. Chapter IV will explain the variables selected for comparative analyses and why they were chosen. Chapter V will discuss the state of each variable in both the disasters and will determine the value of each variable for comparative analyses of both the events in order to draw conclusions. Chapter VI will present conclusions based on the comparative analyses of all the variables and consideration of the facts of both 2010 disasters and will also draw recommendations to improve the disaster response in Pakistan in particular and any other part of the world in general.

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II. HAITI EARTHQUAKE IN 2010

A. BRIEF OVERVIEW OF HAITI

Haiti became the world's first black led republic and the first independent Caribbean state when it threw off French colonial control and slavery in a series of wars in the early 19th century. However, due to sheer poverty, environmental degradation, violence, instability and dictatorship, it became the poorest nation in the Americas. It is a mostly mountainous country with a tropical climate.

Haiti achieved notoriety during the brutal dictatorships of the voodoo physician Francois "Papa Doc" Duvalier and his son, Jean Claude, or "Baby Doc." During their twenty nine year regime tens of thousands of people were killed. After the 1990 election of a former priest, Jean Bertrand Aristide, it was hoped that he would lead the country to a brighter future; but he was overthrown by the military a short time later. Although economic sanctions and U.S. led military intervention forced a return to constitutional government in 1994, Haiti's fortune did not increase with allegations of electoral irregularities, ongoing extra judicial killings, torture and brutality. A bloody revolt and external pressure from the U.S. and France forced Mr. Aristide out of the country in 2004. Since then, an elected leadership has taken over from an interim government and a UN stabilization force has been deployed. But Haiti is still plagued by violent confrontations between rival gangs and political groups, and the human rights situation is downright catastrophic.

Haiti has a very serious issue of a huge wealth gap between the impoverished Creole speaking black majority and the French speaking minority, 1% of who own nearly half the country's wealth. Many Haitians seek work and a better life in the U.S. or other Caribbean nations. The neighboring Dominican Republic is home to hundreds of thousands of Haitian migrants. Furthermore, the infrastructure has collapsed over time and drug trafficking has corrupted both the judicial system and the police. Haiti is very ill equipped to deal with the aftermath of the tropical storms that frequently sweep across

the island, with severe deforestation having left it vulnerable to flooding. It also lies in a region, which is prone to earthquakes. Some of the most important facts about the country are as follows:¹⁴

- Full name: Republic of Haiti
- Population: 10.2 million (UN, 2010)
- Capital: Port au Prince, a coastal city with about two million inhabitants. The geographical coordinates of the city are 18°32'21"North latitude and 72°20'6"West longitude. It is the largest city of the country situated at an altitude of 98 meters above sea level. The city can be accessed by the three airports: Port au Prince International, Cabo Rojo and Jacmel.
- Administrative Divisions and Important Cities of Haiti are: Artibonite, Grand' Anse, Nord, Centre, Nippes, Nord Est, Sud, Sud Est, Ouest and Nord Ouest.



Figure 2. Political Map of Haiti¹⁵

¹⁴ BBC News, "Haiti country profile," No Author. Accessed 26 March 2011. Available http://news.bbc.co.uk/2/hi/americas/country_profiles/1202772.stm.

¹⁵ Maps of World, "Map of the Haiti," No Author. Accessed 26 March 2011. Available <http://www.mapsofworld.com/haiti/haiti-political-map.html>.

- Area: 27,750 sq km (10,714 sq miles)
- Major languages: Creole, French
- Life expectancy: 60 years (men), 64 years (women) (UN)
- Monetary unit: 1 gourde = 100 centimes
- Main exports: Light manufactures, coffee, oils, mangoes
- GDP: \$6,478,628,513 (2009) ¹⁶
- GDP per capita (PPP): \$1,300 – 203rd in the world (2008 est.)
- GNI per capita: Estimated to be low income: \$995 or less (World Bank, 2009)
- Eighty % of the population in Haiti is living under the poverty line.
- Most Haitians live on less than \$2 a day.
- Population Growth rate: 1.84%
- Urban population: 47% of total population
- Ethnic groups: black 95%, mulatto and white 5%
- Religions: Roman Catholic 80%, Protestant 16% (Baptist 10%, Pentecostal 4%, Adventist 1%, other 1%), none 1%, other 3% (note: roughly half of the population practices voodoo)
- Literacy rate: 35%
- Labor force: 3.643 million (2008 est.), more than two thirds of the labor force do not have formal jobs.
- The Haiti telecommunications infrastructure is among the least developed in Latin America and the Caribbean.
- Haiti has fourteen airports, but only four have paved runways.
- Haiti is one of the original members of the United Nations and several of its specialized and related agencies, as well as a member of the Organization of American States (OAS).¹⁷

¹⁶ The World Bank, “Data by country: Haiti,” No Author. Accessed 26 March 2011. Available <http://data.worldbank.org/country/haiti>.

¹⁷ Fox News, “Fast Facts – Haiti Earthquake,” No Author. Accessed 26 March 2011. Available <http://www.foxnews.com/world/2010/01/13/fast-facts-haiti-earthquake/#NATURALDISASTERS>.



Figure 3. Map of Haiti¹⁸

B. NATURE OF DISASTER

Earthquakes have killed more people in the last ten years than any other natural hazard. Almost 60 percent of the people killed by natural disasters between 2000 and 2009 perished in earthquakes; but on the other hand, only four percent of the two billion people struck by disasters were affected by earthquakes. The earthquakes claimed more lives because they were sudden and had an immediate impact. Luckily, the area affected by earthquakes is comparatively small.¹⁹

Since 1900, four out of five deaths caused by earthquakes have occurred in developing countries. In 1950, two of every three people living in earthquake threatened cities lived in developing countries, and by 2000 that number had increased to nine of every ten. Many developing countries do not have building codes; in those that do, the

¹⁸ "Map of Haiti...Old Treasure in the West Indies," No Author. Accessed 26 March 2011. Available <http://www.haitian-culture.com/map-of-haiti.html>.

¹⁹ IRIN Global, "DISASTERS: Earthquakes – the decade's deadliest killer," No Author. Accessed 27 March 2011. Available <http://www.irinnews.org/Report.aspx?ReportId=87908>.

codes are often not enforced because of corruption and poor governance. These countries have fewer experts in earth science and earthquake engineering who are ill equipped and isolated.²⁰ Investment in disaster risk reduction has become mandatory for every earthquake prone city or country. Earthquakes generally recur after a long period, and in Haiti the return period for this level may be about 100 years or more. Therefore, the main issue in Haiti is to reduce the crushing poverty that was the cause of many deaths after the country was struck by the earthquake.²¹

C. FACTS ABOUT EARTHQUAKE IN HAITI

The country was hit by an earthquake of magnitude 7.0 on January 12, 2010 at 04:53:10 PM. Its epicenter was in position 18.443 N, 72.571 W at the depth of 13 km (8.1 miles). The epicenter was at the distance of 25 km (15 miles) WSW from Port Au Prince, 30 km (80 miles) E of Les Cayes, and 150 km (95 miles) S of Cap Haitien.²² Figure 4 shows the epicenter of the earthquake.

USGS called it the strongest earthquake since 1770 in what is now Haiti. It left around three million people in need of emergency aid. The major quake sent thirty-three aftershocks ranging in magnitude from 4.2 to 5.9.²³

The death toll from the Haiti earthquake was the fifth largest in recorded history of natural disasters. Around 230,000 people died, including 101 United Nations staff. Over 300,600 were wounded. Over 97,000 houses were destroyed, and over 188,000 more were damaged to some degree. Three million people were affected, of whom 1.9 million lost their homes, and over 511,000 had left the affected cities.²⁴

²⁰ GEOHAZARDS INTERNATIONAL, "Vulnerable Communities," No Author. Accessed 27 March 2011. Available <http://www.geohaz.org/risk/vulnerable.html>.

²¹ IRIN Global, "DISASTERS: Earthquakes – the decade's deadliest killer."

²² USGS, "Earthquake Hazards Program," No Author. Accessed 24 March 2011. Available <http://earthquake.usgs.gov/earthquakes/recenteqsww/Quakes/us2010rja6.php>.

²³ Fox News, "Fast Facts – Haiti Earthquake."

²⁴ "Evaluation of OCHA Emergency Response to the Haiti Earthquake- Terms of Reference," No Author, current as of 28 July 2010. Accessed 24 March 2011. Available <http://www.alnap.org/pool/files/haiti-tor.pdf>.

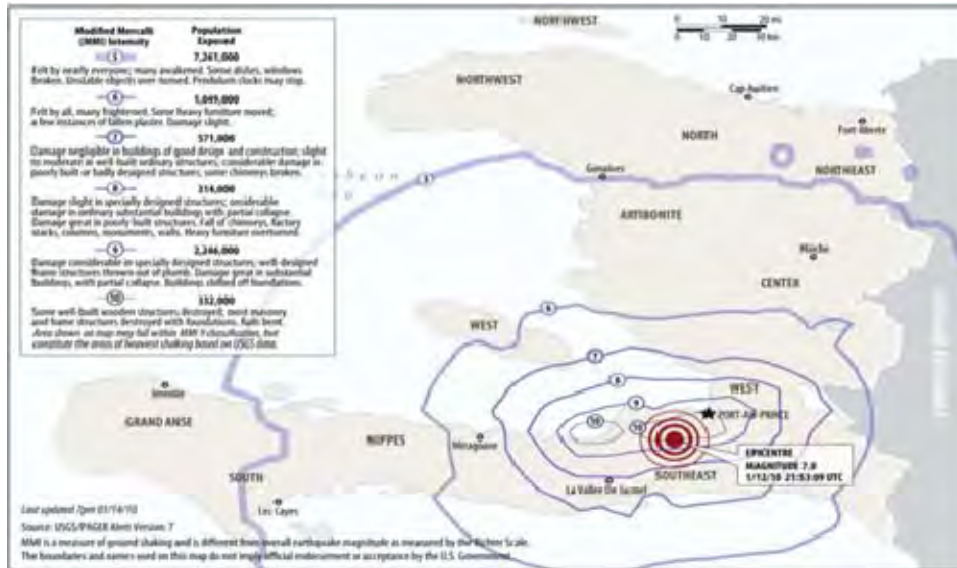


Figure 4. Haiti Earthquake Epicenter²⁵

An estimate of city wise population affected is shown in Table 2.

City	Population
Petit Goave	118,000
Gressier	26,000
Grand Goave	49,000
Leogane	134,000
Carrefour	442,000
Miragoane	89,000
Port au Prince	1,235,000
Delmas 73	383,000
Verrettes	49,000
Santo Domingo	2,202,000

Table 2. Estimate of Population Affected due to Earthquake in Haiti²⁶

²⁵ Maureen T. Morales and Rhoda Margesson, "Haiti Earthquake: Crises and Response," CRS Report for Congress, 15 January 2010. Accessed 26 March 2011. Available http://assets.opencrs.com/rpts/R41023_20100115.pdf.

²⁶ USGS, "M7.0 HAITI REGION Event ID: us2010rja6," No Author, 12 January 2010. Accessed 26 March 2011. Available <http://earthquake.usgs.gov/earthquakes/pager/events/us/2010rja6/onepager.pdf>.

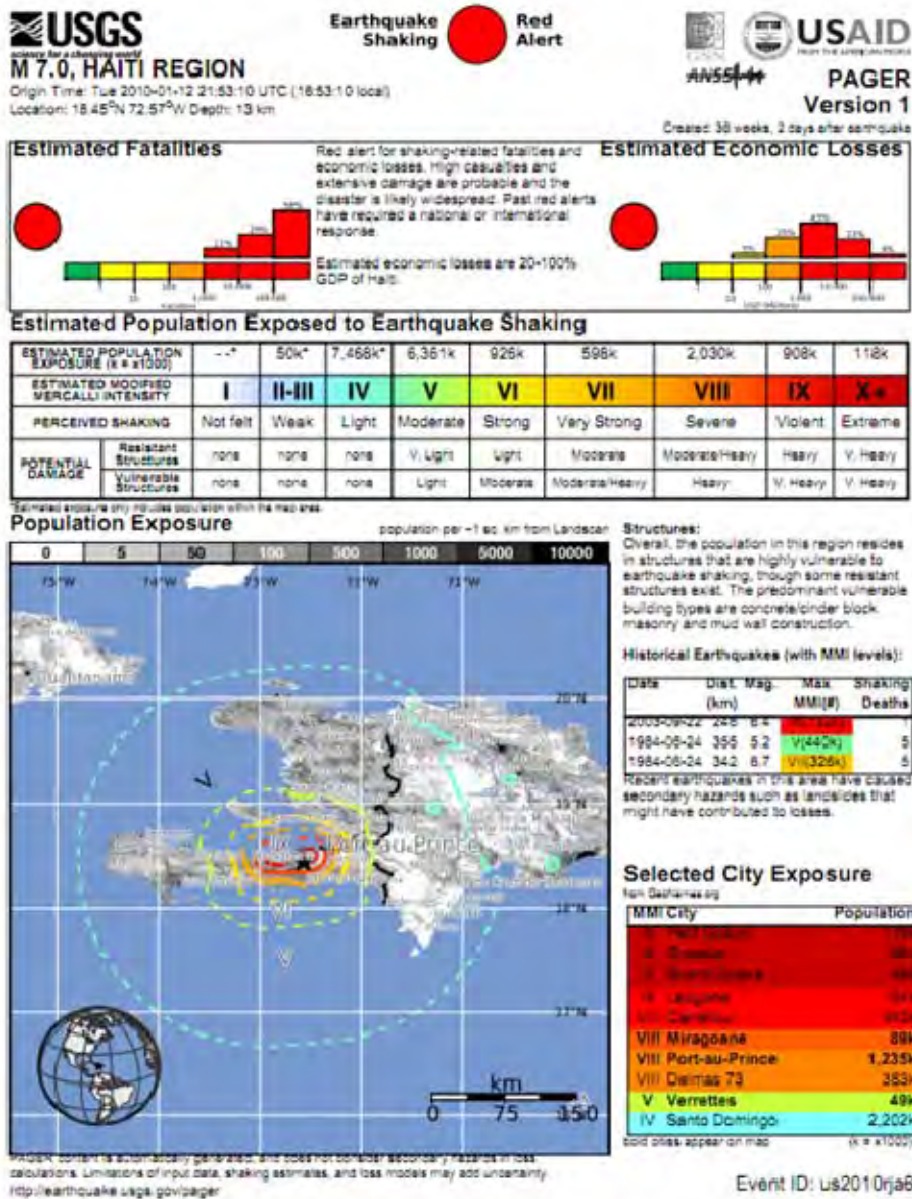


Figure 5. An Estimate of the Population in Haiti and Surrounding Areas Exposed to Ground Shaking Caused by the January 12, 2010 Earthquake²⁷

²⁷ USGS, "M7.0 HAITI REGION Event ID: us2010rja6."

D. PICTORIAL VIEW OF DAMAGE CAUSED BY EARTHQUAKE IN HAITI

The following pictures in Figures 6–10 show the damage caused by the earthquake in Haiti; and also, some of the pictures show the comparison of the places before and after the earthquake hit.²⁸



Figure 6. Inside the City of Port au Prince after the Earthquake

²⁸ Google.com, “Images: Haiti earthquake images before and after,” No Author. Accessed 28 March 2011. Available <http://www.google.com/search?hl=en&biw=1440&bih=775&site=search&tbm=isch&sa=1&q=haiti+earthquake+images+before+and+after&aq=f&aql=&aql=&oq=>.



Figure 7. Port au Prince after the Earthquake



Figure 8. Morne a Tuff, Haiti: Before and After the Earthquake



Figure 9. Downtown Port au Prince After the Earthquake



Figure 10. The Presidential Palace at Port au Prince, Haiti



Figure 11. Port au Prince: Before and after the Earthquake

E. RESPONSE FROM WITHIN THE COUNTRY

Immediately after the earthquake hit the country, the Haitian President appealed for international assistance and described conditions in his country as unimaginable. The search and rescue operation for survivors was declared as the top priority. Other material priorities included an offshore medical vessel and electricity generation capability. After those immediate needs were started to be met and humanitarian relief operations were in progress, the government tried to restore the institutions needed for it to function, and also to begin planning long term reconstruction and development. The Presidential palace was destroyed, but the President survived and was running his nation from a small room. Prior to this disaster, the World Bank and others were working with the Haitian government to incorporate disaster risk management into Haiti's overall development strategy and to develop its capacity for disaster response. The capacity was still in its early stages, and the focus of much of its risk management efforts was toward hurricanes, which are the most common cause of natural disasters on the island, because the last major earthquake hit Haiti was 150 years ago, in 1860. Haitian ministries had been working for long term housing for those left homeless by the earthquake as they operated out of makeshift offices. Haitian authorities, along with international relief agencies, had been delivering food and water to hundreds of makeshift camps in Port au Prince. The government provided free transportation to evacuate people from the capital to safe cities. The Haitian government sent officials to small cities to help local officials in those communities establish priorities.²⁹

Other elements of the government were also working along with international actors. For example, the Haitian National Police were contributing by maintaining security and Haitian air traffic controllers were working along with U.S. controllers at the Port au Prince airport. The government worked with USAID and others in the international community to assess damages and needs. The Haitian government, the United Nations, and donor representatives met in Haiti on January 14th to coordinate

²⁹ Rhoda Margesson and Maureen T. Morales, "Haiti Earthquake: Crises and Response," CRS Report for Congress, 2 February 2010. Accessed 26 March 2011. Available at <http://www.fas.org/sgp/crs/row/R41023.pdf>.

their efforts. Haitian senators elected two commissions on January 28, 2010 to monitor aid and manage agreements with aid organizations.³⁰

F. RESPONSE FROM INTERNATIONAL COMMUNITY

The response to the Haiti earthquake by the international community was immediate and robust. The U.S., Canada, Brazil, Italy, and Cuba sent over 1,000 personnel each. The international community provided over \$2.5 billion in relief funding, the U.S. government alone provided more than \$1.12 billion for earthquake relief and recovery. This response was enormously effective in saving lives and averting another immediate disaster, such as widespread disease, starvation, or major deaths from hurricane Tomas.³¹

The Haiti earthquake ushered in a new humanitarian information environment: one with unprecedented availability of raw data, the growing usage of new information communication technology (ICT), and the emergence of three loosely connected communities of interest centered around the U.S. government, the United Nations and the international community, and a new group (ICT Volunteers) comprised of virtually connected academics, humanitarians, corporate foundations and ICT professionals. All three communities collected, shared, and acted upon enormous amounts of digital information made available on a variety of web portals, platforms and new social networking media, such as Short Message Service (SMS) feeds, Twitter and Facebook.³²

³⁰ Margesson and Morales, "Haiti Earthquake: Crises and Response."

³¹ Paul Weisenfeld, "Using Lessons from Earthquakes in Haiti and Chile to Reduce Global Risk," Speech given at The National Academies Disasters Roundtable Workshop, 1 March, 2011. Accessed 31 March 2011. Available http://www.usaid.gov/locations/latin_america_caribbean/modules/whatsnew/national_acadamies_speech.html.

³² Dennis King, "The Haiti earthquake: breaking new ground in the humanitarian information landscape," *Humanitarian Exchange* issue 48, October 2010. Accessed 27 March 2011. Available <http://www.odihpn.org/report.asp?id=3135>.

1. United Nations Humanitarian Response

The U.N. Security Council increased the overall force of the U.N. Stabilization Mission in Haiti (MINUSTAH), which was established in April 2004, to support the immediate recovery, reconstruction and stability efforts. The council decided to increase MINUSTAH personnel up to 8,940 military troops of all ranks and up to 3,711 police troops and review the strength as necessary, and could achieve 6,940 troops for the military component and 2,211 for the police component. The headquarters of the U.N. Stabilization Mission in Haiti (MINUSTAH) was demolished in the earthquake and a number of military and civilian MINUSTAH personnel died, including the head of MINUSTAH and his deputy. UN Secretary General Ban Ki moon appointed Edmond Mulet, Assistant Secretary General, Office of Operations, Department of Peacekeeping Operations, to serve as Acting Special Representative to the Secretary General (SRSG) and Head of MINUSTAH. MINUSTAH had been engaged in providing search and rescue operations, security, assistance, in creating and maintaining a secure environment for recovery and in training a viable police force.³³

The United Nations also established Disaster Assessment and Coordination (UNDAC) and the U.N. Office for the Coordination of Humanitarian Affairs (OCHA) teams immediately after the disaster. The UNDAC team coordinated the Onsite Operations and Coordination Center (OSOCC). Two sub OSOCCs were established in Jacmel and Leogane to assist local authorities.³⁴ On January 13, 2010, OCHA classified the response to Haiti earthquake as ‘corporate,’ requiring a ‘whole of organization’ effort, which was later deactivated on March 12, 2010. The OCHA Haiti office was expanded from five to over fifty international staff within the first week. The Flash Appeal, launched in a record of seventy two hours, requested US\$575 million for an initial 6 months period and it was over 100% funded. The Revised Humanitarian Appeal, launched on February 18th, asked for \$1.4 billion over a one year period of relief and early recovery, was adjusted following a Mid Year Review (MYR) to \$1.488 billion, of

³³ Margesson and Morales, “Haiti Earthquake: Crises and Response.”

³⁴ King, “The Haiti earthquake: breaking new ground in the humanitarian information landscape.”

that 64 percent was funded as of July 24, 2010 for humanitarian operations alone. UN Central Emergency Response Fund (CERF) allocations exceeded US\$36 million, and the Emergency Recovery and Reconciliation Fund (ERRF) support has been US\$76 million, out of that some US\$ 60 million have already been disbursed.³⁵

OCHA worked closely with the government of Haiti and was the lead agency working with all actors on the ground. The Humanitarian Country Team was convened on February 1st and held meetings twice a week. In consultation with MINUSTAH and international military forces, OCHA developed a Joint Operations Tasking Centre (JOTC), which began operating on January 26th and focused on civil military coordination and logistics. The OCHA Civil Military Coordination (CMCoord) team was convened on January 31, 2010 and brought together civil military points of contact from humanitarian organizations, MINUSTAH, and international military forces. Humanitarian relief sectors were typically established during humanitarian crises to enable the United Nations to coordinate partners, prioritize resources, and facilitate planning. Relief sectors were organized into twelve clusters led by various agencies. The clusters include:³⁶

- Agriculture (Food and Agriculture Organization, FAO)
- Camp Coordination and Camp Management (International Organization for Migration, IOM)
- Early Recovery (U.N. Development Program, UNDP)
- Education (U.N. Children's Fund, UNICEF)
- Emergency Shelter and Non Food Items (IOM and the International Federation of Red Cross and Red Crescent Societies, IFRC)
- Emergency Telecommunications (World Food Program, WFP)
- Food (World Food Program, WFP)
- Health (World Health Organization, WHO, and Pan American Health Organization, PAHO)

³⁵ "Evaluation of OCHA Emergency Response to the Haiti Earthquake."

³⁶ King, "The Haiti earthquake: breaking new ground in the humanitarian information landscape."

- Logistics (WFP)
- Nutrition (UNICEF)
- Protection (Office of the High Commissioner for Human Rights, OHCHR), with Child Protection (UNICEF) Gender Based Violence (U.N. Population Fund, UNFPA)
- Water, Sanitation, and Hygiene (UNICEF)

These clusters were mobilized; for example, WFP was engaged in supporting immediate relief efforts and was also working on emergency logistics and telecommunications. Together with the United Nations Humanitarian Response Depot (UNHRD), they were providing food from El Salvador as well as distributing relief supplies and food from a depot in Panama. WHO was coordinating medical assistance, particularly victim's care. UNICEF focused on identifying and reuniting children with their families.³⁷

UN humanitarian agencies first began tracking the post earthquake situation using three OCHA managed web portals/platforms: GDACS, VOSOCC and ReliefWeb. UN Disaster Assessment Coordination (UNDAC) teams and international search and rescue teams were dispatched to Port au Prince, using VOSOCC to mobilize and coordinate deployment. The UNDAC team included information management and GIS personnel to provide situation reports and maps for the international humanitarian response community. The UN also launched a new OCHA portal, OneResponse, to store and share data, information and analysis related to each of the cluster activities. Several clusters set up Google Groups to facilitate information sharing, collaboration and coordination. Information management tools such as the Joint Operations Tasking Center (JOTC) logistics form, a Who is Doing What Where (3W) database, the Multi Cluster Rapid Assessment methodology, the Displacement Tracking Matrix, the Post Disaster Needs Assessment and Recovery Framework and the Cluster meeting calendar and directories were established to facilitate coordination and information management.³⁸

³⁷ King, "The Haiti earthquake: breaking new ground in the humanitarian information landscape."

³⁸ Ibid.

2. The U.S. Government Response

The Haiti earthquake marked the largest U.S. humanitarian response to a natural disaster, code named Operation Unified Response Haiti. USAID was designated as the lead agency for the U.S. humanitarian response. As of August 13, 2010, USAID had committed over \$655 million in supplies, grants and support. At the height of the disaster response, U.S. Southern Command (SOUTHCOM) dedicated approximately 22,000 personnel, deployed 33 ships and 130 aircraft for humanitarian transport, emergency shelter distribution to 1.5 million people and a vaccination campaign for more than 1 million people. The U.S. Department of State obligated \$11.2 million to assist displaced people and host families and to support repatriation and resettlement programs. Because of its proximity to Haiti, the U.S. was quickly able to dispatch a USAID Disaster Assistance Response Team (DART) and SOUTHCOM personnel set up U.S. Joint Task Force Haiti to manage and coordinate logistics and to support other U.S. government humanitarian response activities. Coordination centers were established at SOUTHCOM headquarters in Miami and at USAID and the State Department in Washington. Defense, State and USAID personnel were assigned to each other's coordination centers to serve as liaisons and advisors in an effort to develop and implement a 'whole of government' approach to the response. Representatives from UN agencies and NGOs also served as liaisons in some of these coordination centers, as well as with some U.S. government teams in Haiti. This helped to establish personal relationships, facilitate information sharing and provide greater mutual understanding. Another key decision was to use unclassified information whenever possible, and to use public platforms for sharing information. Much of the Defense Department's humanitarian relevant data and information was kept unclassified and shared widely within the Haiti earthquake response. SOUTHCOM launched the All Partners Access Network (APAN), a platform originally developed by U.S. Pacific Command, to share unclassified information and enhance collaboration and operational coordination. SOUTHCOM made password registration available to anyone on request, and within three weeks APAN had over 1,800

registered users. Imagery products, maps, photos, assessments, situation reports, common operational pictures and requests for information were all made available on APAN.³⁹

The main U.S. government elements involved include U.S. Agency for International Development (USAID), U.S. Department of Defense/U.S. Southern Command (SOUTHCOM), U.S. Department of State, Department of Homeland Security/Federal Emergency Management Agency (DHS/FEMA), U.S. Coast Guard, Department of Health and Human Services, and United States Geological Survey; they all worked at Haiti. The portals/platforms used were All Partner Access Network (APAN), Intellipedia, Diplopedia, and Civil Military Fusion Center.

3. ICT Volunteers

Within hours of the earthquake, a new community of virtually connected volunteers affiliated with ICT consulting companies, private corporations, open source software proponents, academic/research institutions, NGOs and the Haitian diaspora began applying new ICT applications to the earthquake response. Web 2.0 social network media were used as a new means of data collection, information sharing and collaboration. Within days, individuals from this community, with support from the U.S. State Department, worked with ICT companies to establish an SMS 4636 code for the free transmission of text messages to and from Haiti. Google adapted its suite of tools to support the Haiti earthquake response and helped develop a Person Finder application to help find and connect people in Haiti who could not be contacted. Microsoft and Infusion provided technical assistance to the Inter American Development Bank in creating a Haitian Integrated Government Platform to aggregate data on humanitarian and reconstruction activities in order to track and gauge progress. A nascent, virtual CrisisMappers network utilized an open source interactive mapping platform known as Ushahidi to gather, extract and plot geo referenced data on a public website. Over the course of the disaster, Ushahidi and volunteer diaspora translators received over 80,000 text messages; approximately 3,000 were used in some way during the response. Other geo referenced data was gleaned from Twitter, blogs, the news media and humanitarian

³⁹ King, "The Haiti earthquake: breaking new ground in the humanitarian information landscape."

situation reports to provide situational awareness products, including maps. The U.S. Coast Guard, the 22nd U.S. Marine Expeditionary Unit and other first responders used these social media platforms to support their emergency assistance operations. Individuals from the U.S. government, the UN and some NGOs were also connected to this network. The main ICT Organizations working in Haiti included Google, InSTEDD, Fortius One/GeoCommons, OpenStreet Map, Tufts/Harvard universities, Frontline SMS, ICT4Peace, Sahana, Thompson Reuters Foundation and Microsoft. The Portals/platforms used were CrisisMappers.net, SMS 4636, Ushahidi, Star Tides, Haiti Voices, ICT4Peace Inventorization Wiki, CrisisCamp Haiti, CrisisCommons Wiki, crisescomm.ning.com, etc.⁴⁰

4. Response from Regional Countries

Latin American countries responded to Haiti's crisis with immediate provision of emergency supplies, personnel, financial help and other assistance for its long term recovery. Members of the Organization of American States (OAS) Group of Friends of Haiti met on January 14th to coordinate search and rescue efforts, prompt donations, and discuss ways to promote recovery. The Caribbean Community (CARICOM) mobilized its disaster emergency response system to assist Haiti and several member states provided emergency supplies and financial assistance. The Caribbean Disaster Emergency Management Agency assembled a response team to assess conditions in Haiti as well. Many countries in the region already had peacekeeping troops in Haiti serving with MINUSTAH. Brazil was leading the participation in UN peacekeeping mission and had 1,284 uniformed personnel already serving there as of December 2009.⁴¹

⁴⁰ Morales and Margesson, "Haiti Earthquake: Crises and Response."

⁴¹ Ibid.

5. General Facts/Figures

Below are some of the facts and figures, which highlight the amount of work done and achievements by the international community for Haiti after the earthquake:⁴²

- Around 1,000 humanitarian organizations participated in the earthquake relief operations.
- Representatives from 216 organizations, including UN agencies, UN affiliated organization, NGOs, military responders, and government, have attended Logistics Cluster meetings.
- The logistics cluster facilitated the deliveries of emergency relief items through a truck fleet managed by Handicap International/Atlas Logistique.
- Up until October 2010, 10,050 mt (46,500 m³) of relief goods had been dispatched from Port au Prince to the affected places (90% by land and 10% by air). These dispatches include 48% shelter items, 15% food items, 15% agriculture items, 8% water and sanitization items and 5% logistics equipment for 106 different organizations working on ground. Also 1,300 truckloads have been dispatched from Santo Domingo to Haiti delivering more than 9,300 mt (35,000 m³) of relief supplies.
- Fifty organizations have used storage facilities available for the Humanitarian Community in Port au Prince. In additional, a number of storage places were arranged at other locations for relief organizations.
- As of August 2010, over 15,000 passengers from some 500 different UN Agencies, donors, NGOs, governments, embassies and media institutions have used the UNHAS passenger transport services. The helicopters have flown numerous assessment missions to more than ninety isolated villages and have delivered more than 900 mt (3,100 m³), mainly medicines, food and shelter items to forty eight different locations.

⁴² Reliefweb, "Logistics Clusters Haiti Earthquake Response," No Author, 21 October 2010. Accessed 26 March 2011. Available [http://www.reliefweb.int/rw/RWFiles2010.nsf/FilesByRWDocUnidFilename/VVOS-8AGKMR-full_report.pdf/\\$File/full_report.pdf](http://www.reliefweb.int/rw/RWFiles2010.nsf/FilesByRWDocUnidFilename/VVOS-8AGKMR-full_report.pdf/$File/full_report.pdf).

- Since June 21, 2010, a chartered 1,500 mt barge has been providing a viable alternative to road transport for the humanitarian response programs.
- A 1x Mi-171 helicopter with a 3 mt capacity was available for use to deliver relief goods to inaccessible areas. MINUSTAH, U.S. and Canadian military helicopters were available for additional airlift capacity through the JOTC.

G. HURRICANE TOMAS LOSSES

On November 5, 2010, hurricane Tomas passed within about 140 miles (230 kilometers) of Port au Prince. In the town of Jérémie, many houses were destroyed, trees downed and rivers flooded, and a huge area of the coastal city of Leogane was inundated with several feet of water.⁴³ The camps in the Haitian capital housing 1.3 million quake survivors remained safe. The hurricane, however, killed six people and about 10,000 people were evacuated from their homes to escape floodwaters. Due to early warning, people were well prepared; there was good cooperation between the government and the aid community and the worst effects were therefore avoided. Flooding in a number of locations posed the risk of worsening the cholera epidemic, which over two weeks had killed more than 440 people and sickened more than 6,700. Relief agencies rushed clean drinking water and food to areas affected by the floods to avoid spread of diarrhea. One of the worst hit zones was Leogane, a town west of Port au Prince, which was badly damaged in the January earthquake. Some 90,000 people were already living in tent camps. Flooding was also reported in the coastal towns of Les Cayes, Jacmel and Gonaives.⁴⁴ Some details of other damages caused by the hurricane were:⁴⁵

⁴³ CNN Wire Staff, "Hurricane Tomas lashes already devastated Haiti," No Author, 5 November 2010. Accessed 1 April 2011. Available http://articles.cnn.com/2010-11-05/world/tropical.weather_1_haiti-flash-floods-and-mudslides-storm-shelters?s=PM:WORLD.

⁴⁴ Matthew Bigg, "Haiti dodges storm disaster, but urgent needs remain," REUTERS, 6 November 2010. Accessed 1 April 2011. Available <http://www.reuters.com/article/2010/11/06/us-haiti-storm-idUSTRE6A27Z220101106>.

⁴⁵ CCCM, "Hurricane Tomas and cholera response Situation Report," No Author, 12 November 2010. Accessed 1 April 2011. Available <http://www.cccmhaiti.info/page.php?id=32>.

- Number of families affected: 19,739
- Tents damaged: 9,676
- Tents destroyed: 2,140
- Tents flooded : 4,848
- Number of sites with latrines flooded: 53 (With a reported number of 142 latrines)
- Number of sites with latrines damaged: 40 (With a reported number of 100 latrines)
- Camps with significant standing water: 126
- Camps with blocked canals: 65

H. RESPONSE FROM THE INTERNATIONAL COMMUNITY DURING THE HURRICANE

The international community helped the Haitian government to respond to the effects of Hurricane Tomas. The Disaster Assistance Response Team (DART) coordinated the U.S. government's response, working closely with the government of Haiti's Departement de Protection Civile (DPC), the UN Stabilization Mission in Haiti (MINUSTAH), USAID implementing partners throughout the country, ships and helicopters from the U.S. Southern Command and the U.S. Coast Guard. In response to humanitarian needs among affected populations following the storm, the DART authorized the release from prepositioned stocks of kitchen sets, hygiene kits, water containers, blankets, and plastic sheets to benefit 27,500 people, both in Jérémie and Les Cayes in southwestern Haiti, as well as residents in some of the displaced persons camps in and around Port au Prince. U.S. Navy and Marine Corps helicopters from the U.S.S. Iwo Jima performed a number of damage assessment missions over Haiti, and in coordination with MINUSTAH, provided information in support of the Haitian government's needs. Measures taken by USAID in and around Gonaïves, such as soil stabilization and reforestation, the rehabilitation and construction of storm canals, a drainage system in the city, and the expansion of a drainage lake were instrumental in increasing water flow, and thus prevented the type of damage that Gonaïves has seen in

previous such storms. The U.S. government also supported the DPC, the agency on the front lines of Haiti's disaster response; funded the government of Haiti's interagency command center, as well as the construction of emergency operations centers and disaster relief warehouses; supported efforts to communicate with affected populations, including through SMS and radio; and delivered equipment, including foul weather gear and megaphones.⁴⁶

A number of UN agencies including the Office for the Coordination of Humanitarian Affairs (OCHA), which coordinated preparations for the hurricane; International Organization for Migration (IOM), which moved thousands of people from exposed camps to safe places; UN Stabilization Mission in Haiti (MINUSTAH), which assisted local authorities by providing transportation for people to move to provisional shelters; UN World Health Organization (WHO), which sent 10,000 emergency health kits to Port au Prince and 10,000 to 20,000 kits to other areas for treating water borne diseases and UN children's Fund (UNICEF) had been sharing health and sanitation related information and distributing oral rehydration salts and water purification tablets.⁴⁷ The United Nations World Food Program (WFP) has been working closely with the Haitian authorities and other partners to distribute high energy biscuits and ready to eat meals (MREs) to thousands of people who had taken refuge in schools and churches in the southwest of the country. In some of the most storm affected areas, such as Jérémie, distributions began within hours of the first heavy rains.⁴⁸

⁴⁶ Embassy of the United States at Port-au-Prince, Press Release, No Author, 8 November 2010. Accessed 1 April 2011. Available <http://haiti.usembassy.gov/press-releases-2012/u.s.-government-assists-in-hurricane-tomas-efforts-november-8-2010>.

⁴⁷ UN News Centre, "UN system prepares for landfall of Hurricane Tomas on Haiti," No Author. Accessed 1 April 2011. Available <http://www.un.org/apps/news/story.asp?NewsID=36678&Cr=haiti&Cr1=>.

⁴⁸ World Food Programme New, "WFP Delivers Emergency Food Supplies in Haiti After Hurricane Tomas," No Author, 7 November 2010. Accessed 1 April 2011. Available <http://www.wfp.org/news/news-release/fp-delivers-emergency-food-supplies-haiti-after-hurricane-tomas>.

I. MODERN TOOLS USED DURING EARTHQUAKE RELIEF OPERATIONS BY RELIEF ORGANIZATIONS

Every modern disaster response operation requires reliable modes of communication; but in Haiti, the importance of the media rose to a new level. Haiti became the first real world crisis laboratory for several media platforms and tools that had only recently emerged. These tools were applied to support rescue efforts, assist displaced populations and coordinate massive relief operations. The Haitian earthquake marked the first large scale application of new approaches to create a connection and information exchange mechanism between citizens and relief workers, such as crowd sourcing and other projects, which combined the reach of cell phones and radio technology. The new tools encouraged new forms of collaboration among local media, technological innovators, and large international organizations.⁴⁹

Technology was used for fund raising via SMS donations and many Americans first heard of digital charity through the Red Cross 90999 campaign for Haiti. This technique helped raised \$5 million within forty four hours of the earthquake and \$20 million within five days.⁵⁰

Once the text messaging system was set up, additional technology teams set to work. International Media Support, a Copenhagen based NGO, worked with Internews and other organizations to create a mapping system based on Google maps to identify working radio stations in the Port au Prince area. Within days, thousands of messages were received and teams of Haitians from the diaspora volunteered to translate and map the information, which was then delivered to all the actors involved in the relief operations.⁵¹ Some of the most important tools used during relief operations are described in the following paragraphs.

⁴⁹ Knight Foundation, "Media, Information Systems and Communities: Lessons from Haiti," No Author. Accessed 27 March 2011. Available <http://www.knightfoundation.org/dotAsset/377221.pdf>.

⁵⁰ Ibid.

⁵¹ Ibid.

1. Social Networking and Crisis Management

The trend of using social networking sites to stay in regular contact with one another has increased throughout the world. These sites have featured prominently in recent disasters, especially with the Haiti earthquake. People used these sites to share links to web resources, as well as photos and videos uploaded by those near the disaster. Tools like Twitter coordinate well with sites like Facebook to allow users the ability to send a quick update to their Facebook page with a text message from their phone. The Red Cross launched the Safe and Well List where people can quickly register and indicate that they are safe and sound. Family and friends can search for a relative using the same site and verify their loved ones' safety. People in or near a disaster area can send a text message from their phone to the Safe and Well List via Twitter, or they can use the full website interface.⁵² In case of a disaster in bigger urban areas, available bandwidth may be constrained due to loss of some of communication infrastructure, heavy communication requirements by the relief agencies and extensive use of social media and other communication channels by the public because everybody would be trying to contact their loved ones or would be asking for help. Therefore, media may try to bring awareness among the people for judicious and right use of social media at the time of disasters to avoid jamming or slowing the communication and depriving everyone of this useful facility, which may cause more loss of life.

2. Ushahidi

One of the most important tools used in Haiti was Ushahidi, an open source tool that allows users to report events via text message, and for those reports to be located on an online map. In Haiti, eyewitnesses used Ushahidi to report events such as survivors who were trapped under collapsed buildings. Using the GPS coordinates of the phone that the text messages were sent from, these reports were mapped online, allowing volunteers to direct relief resources to victims' location. Ushahidi and many of the other disaster

⁵² Penn State College of Earth and Mineral Sciences Website, "Lesson 8: Case Study Collaborative Project," No Author, 14 December 2010. Accessed 27 March 2011. Available https://www.e-education.psu.edu/geog588/18_p5.html.

relief tools were developed by volunteer programmers who gave their free time to build these applications that can save lives. These tools are the work of loosely coupled organizations such as Crisis Camp, a community of volunteer developers that organizes networking events around the world. Its members collaborate on prototype methods for aggregating and understanding crisis data and build applications to help organize disaster response teams. The tools that Crisis Camp members donated to the Haiti relief effort ranged from a mobile application that translates text messages from Haitian Creole into English, to an entire online social network for relief workers.⁵³



Figure 12. SMS Reporting and Feedback Cycle in Ushahidi v0.1⁵⁴

3. Global Disaster Alert Coordination System (GDACS)

The Global Disaster Alert and Coordination System provides near real time alerts about natural disasters around the world and tools to facilitate response coordination, including media monitoring, map catalogues and Virtual On Site Operations

⁵³ Daniel Shane, "Pulling together in a crisis," 28 February 2011. Accessed 27 March 2011. Available <http://www.information-age.com/channels/information-management/it-case-studies/1605603/pulling-together-in-a-crisis.shtml>.

⁵⁴ Coyle and Meler, "New Technologies in Emergencies and Conflicts," 3.

Coordination Centre.⁵⁵ GDACS automatically monitors earthquakes. For each earthquake, it calculates humanitarian impact based on magnitude, depth, affected population and their vulnerability and resilience. Detailed reports with affected infrastructure are available and updated regularly. Every fifteen minutes, GDACS collects in an automatic way, media reports, damage maps, ReliefWeb situation reports and more about the earthquakes.

4. Virtual On Site Operations Coordination Center (VOSOCC)

The Virtual On Site Operations Coordination Centre (VOSOCC) is a web based information management tool developed by the Field Coordination Support Section (FCSS) of the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), Geneva. The VOSOCC is an integral partner of the Global Disaster Alert and Coordination System (GDACS). The GDACS provides near real time alerts of natural disasters around the world to facilitate response coordination, including media monitoring, map catalogues and the VOSOCC. The VOSOCC is designed as an online information portal for the facilitation of information exchange between responders and affected counties before, during and after sudden onset disasters. Access to the VOSOCC is password restricted to disaster managers from governments and disaster response organizations. The main two requirements of the VOSOCC are operational communication, which includes the information exchange in the run up to and during a disaster, and the preparatory communication, which includes information exchange used for the building of understanding through training events, meetings and other discussions.⁵⁶

⁵⁵ GDACS, No Author. Accessed 31 March 2011. Available <http://www.gdacs.org/>.

⁵⁶ Reliefweb, "United Nations Office for the Coordination of Humanitarian Affairs /Global Disaster Alert and Coordination System, Virtual On-Site Operations Coordination Centre user guide," No Author. Accessed 31 March 2011. Available [http://www.reliefweb.int/rw/lib.nsf/db900sid/PANA-78YE8Z/\\$file/unocha-may2007.pdf?openelement](http://www.reliefweb.int/rw/lib.nsf/db900sid/PANA-78YE8Z/$file/unocha-may2007.pdf?openelement).

5. ReliefWeb

This portal serves the information needs of the humanitarian relief community. This site makes it easier to find what you're looking for. All key pages, like the new 'updates' page and country pages, have a power browser that lets you quickly filter down to relevant humanitarian reports, maps and other content.⁵⁷

6. OneResponse

OneResponse is a collaborative inter agency website designed to enhance humanitarian coordination within the cluster approach, and support the predictable exchange of information in emergencies at the country level. The website supports Clusters and OCHA fulfill their information management responsibilities as per existing Inter Agency Standing Committee (IASC) guidance.

7. GoogleGroups

This is a social networking site offered by Google, which lets people create an account, setup a group and then invite people to join the group. These groups can then be used for online discussions or emails. During a disaster, these groups may be used by people to share information regarding their status with their friends and relatives. They may also ask those who are living at safe places to get them help if they need any. If local disaster management authorities work to prepare a group of locals, it can use this platform as a means to educate people to prepare for disaster response and preparedness. And after a disaster occurs, it could use this group to update their plots of the affected areas and population and conduct the relief and recovery operations more effectively. There were a number of Google groups, which connected Haitians and other people related to the relief and recovery operation for better coordination and to maintain communication.⁵⁸

⁵⁷ ReliefWeb Website, No Author. Accessed 9 April 2011. Available <http://www.reliefweb.int/rw/dbc.nsf/doc100?OpenForm>.

⁵⁸ Google.com, "Google groups," No Author. Accessed 10 July 2011. Available <http://groups.google.com/groups/dir?lnk=srgmt&q=how+was+google+groups+used+in+Haiti>.

8. AlertNet

AlertNet is a free humanitarian news service website run by Thomson Reuters Foundation that provides trusted news and information on natural disasters, conflicts, refugees, hunger, diseases and climate change. The site is very useful for relief workers, donors, policymakers, researchers, students, journalists and the general public.⁵⁹

9. All Partner Access Network (APAN)

After the earthquake in Haiti, U.S. Southern Command (SOUTHCOM) made available a web based tool named All Partners Access Network (APAN), which was an unclassified, open source method of sharing information with the entire international relief community. All Partners Access Network (APAN) was designed by U.S. Pacific Command to enhance collaboration and operational coordination. With its open password registration, APAN attracted over 1,800 users during the first three weeks following the Haiti earthquake, and quickly became one of SOUTHCOM's chief means of sharing information outside the command's domain. It helped SOUTHCOM respond to requests for assistance, maintain situational awareness through user updates, and share DOD imagery with the international community.⁶⁰ The All Partners Access Network (APAN) enables networking and communication, increases situational awareness and provides a forum for sharing lessons learned and best practices in crisis response, humanitarian assistance, disaster relief, and training and exercises.⁶¹

10. Civil Military Fusion Center

In the Civil Military Fusion Center (CFC), a team of civilian and military subject matter experts work closely with one another to gather, analyze, and share the relevant

⁵⁹ AlertNet, No Author. Accessed 31 March 2011. Available <http://www.trust.org/alertnet/learn-more-about-us/>.

⁶⁰ Gen Douglas M. Fraser, USAF and Maj Wendell S. Hertzelle, USAF, "Haiti Relief: An International Effort Enabled through Air, Space, and Cyberspace," p.11. Accessed 10 July 2011. Available http://www.airpower.au.af.mil/airchronicles/apj/apj10/win10/2010_4_03_fraser.pdf.

⁶¹ All Partners Access Network, No Author. Accessed 31 March 2011. Available <https://community.apan.org/p/about.aspx>.

information pertaining to a crisis situation through a website portal called the Civil Military Overview (CMO). The key components of the CFC are its sector focused Knowledge Managers (KM), whose experience and expertise allow them to better assemble, edit, fuse and disseminate the right type of sector information to the CMO's user community. KMs are representatives from recognized, credible, and like minded security and humanitarian organizations. As such, they have the ability to "reach back" to the resources, expertise and contacts of their parent organizations. This arrangement greatly expands the social network of the CFC and its access to the relevant information surrounding a natural or manmade crisis.⁶²

11. OpenStreetMap

OpenStreetMap is a community of approximately 150,000 mappers dedicated to build a free and open map of the world. Approximately 640 mappers participated in the efforts to build an open base map of Haiti. OpenStreetMap did a great job in Haiti and provided an updated and accurate street map of Haiti from scratch in about two weeks, a project that would have usually taken about a year.⁶³

12. CrisisCamps/CrisisCommons

CrisesCamp/CrisesCommons started in 2009 as a venue through those crisis response professionals could explore ways to share best practices. It transformed into a structure for mobilizing almost 2,000 laypeople (mostly technologists) in twenty five cities around the world to swarm around information needs generated by the Haiti operation.⁶⁴

⁶² Scribd.com, "Civil-Military Fusion Center," No Author, FAQs. Accessed 31 March 2011. Available <http://www.scribd.com/doc/23266074/Military-Civilian-Fusion-Center-FAQ>.

⁶³ John Crowley and Jennifer Chan, "DISASTER RELIEF 2.0: The Future of Information Sharing in Humanitarian Emergencies," p.26. Accessed 31 March 2011. Available http://www.globalproblems-globalsolutions-files.org/gpgs_files/pdf/2011/DisasterResponse.pdf.

⁶⁴ Ibid.

13. 4636 Alliance

4636 Alliance is a partnership of FrontlineSMS, the Thompson Reuters Foundation Emergency Information Service, InSTEDD, and Internews to offer an SMS short code and associated services to Haitian citizens. It was affiliated with the Communicating with Disaster Affected Communities initiative.⁶⁵ InSTEDD brought together leading figures from the technology field and the technology team settled on the digits 4636. Digicel, Haiti's largest telecom, agreed to make it available to the public for free. Initially, Digicel service was the only means through that the Haitian population could make remote contact with aid agencies for no cost; but later Voila, Haiti's second largest telecom, joined the effort and added a second short code 200.⁶⁶

14. Crisis Mappers and Open Aerial Mapping

A GeoEye/Google partnership released high resolution imagery of the Haiti twenty six hours after the quake. Digital Globe soon followed. The providers released the imagery under an "attribution only" license that allowed derived works and redistribution via other online and offline channels. The Disaster Risk Management group in the World Bank in coordination with Crisis Mappers commissioned the Rochester Institute of Technology (RIT) and ImageCat to collect 15 cm aerial imagery of Port au Prince. From January 21–29, 2010, the teams' flew a prop aircraft in box patterns and released the imagery into the public domain. This transformed the work of the response. A community of geospatial experts, loosely coordinated by the Crisis Mappers' mailing list, applied geospatial and crowdsourcing tools for the analysis of humanitarian emergencies. Around 550 of its members participated in the Haiti efforts and became the central mechanism for coordinating imagery and mapping activities in Haiti. Its members

⁶⁵ Crowley and Chan, "DISASTER RELIEF 2.0: The Future of Information Sharing in Humanitarian Emergencies."

⁶⁶ Ibid .

included representatives from UNOSAT, Google, GeoEye, Digital Globe, OpenStreetMap, and the San Diego State University Visualization Lab.⁶⁷

⁶⁷ Crowley and Chan, “DISASTER RELIEF 2.0: The Future of Information Sharing in Humanitarian Emergencies.”

III. PAKISTAN FLOODS IN 2010

In the past I have visited the scenes of many natural disasters around the world, but nothing like this. I will never forget the destruction and suffering I have witnessed today. The scale of this disaster is so large, so many people, in so many places, in so much need

UN Secretary General Ban Ki moon⁶⁸

Make no mistake: this is a global disaster, a global challenge. It is one of the greatest tests of global solidarity in our times. Pakistan is facing a slow motion tsunami

UN Secretary General Ban Ki moon⁶⁹

The Muslim majority state of Pakistan was born out of the partition of the Indian subcontinent in 1947 to meet the demands of Indian Muslims for their own homeland. Pakistan was originally in two parts. The east wing, present day Bangladesh, is on the Bay of Bengal bordering India and Burma. The west wing, present day Pakistan, stretches from the Himalayas down to the Arabian Sea. The breakup of the two wings came in 1971 when the mainly Bengali speaking east wing wanted a separate independent country. Civilian politics in Pakistan in the last few decades has been tarnished by corruption, inefficiency and confrontations between various institutions. Alternating periods of democracy and military dictatorship have not helped to establish stability. Pakistan came under military rule again in October 1999 under coup leader, General Pervez Musharraf, who then pledged to revive the country's fortunes, but faced economic challenges as well as an increasing polarization between Islamist militancy and the modernizing secular wing of Pakistani politics. Pakistan's regained its importance in the world stage after the September 11, 2001 terrorist attacks in the U.S. It suspended its support for the Taliban regime in Afghanistan and was propelled into the frontline in the fight against Al Qaeda and terrorism, becoming a key ally of Washington. Internal

⁶⁸ Secretary-General Ban Ki-moon, "Opening remarks at press conference following visit to the flood-affected zones in Pakistan," UN News Centre, 15 August 2010. Accessed 28 March 2011. Available http://www.un.org/apps/news/infocus/sgspeeches/search_full.asp?statID=912.

⁶⁹ UN News Centre, "General Assembly hears calls for global solidarity to help flood-hit Pakistan," No Author, 19 August 2010. Accessed 28 March 2011. Available <http://www.un.org/apps/news/story.asp?NewsID=35670>.

politics in the country once again saw a change when, under growing pressure to reintroduce democracy, Mr. Musharraf relinquished as army chief in November 2007. At parliamentary elections in February 2008, Pakistan People's Party (PPP) and former Prime Minister Mian Nawaz Sharif's party Pakistan Muslim League Nawaz group (PML(N)) had a joint victory and forced Mr. Musharraf to resign in August 2008. Pakistani forces are heavily engaged on its eastern borders to maintain defenses along the border with India and are also struggling to maintain control over the restive tribal regions along the Afghan border, where Taliban linked militants became firmly entrenched. The country is prone to floods and also earthquakes. Some important facts about the country are:⁷⁰

- Full name: Islamic Republic of Pakistan
- Population: 184.7 million (UN, 2010)
- Capital: Islamabad
- Largest city: Karachi
- Area: 796,095 sq km (307,374 sq miles), excluding Pakistani administered Kashmir (83,716 sq km/32,323 sq miles)
- Major languages: English, Urdu, Punjabi, Sindhi, Pashto, Balochi
- Major religion: Islam
- Life expectancy: 68 years (men), 68 years (women) (UN)
- Monetary unit: 1 Pakistani Rupee (PKR)=100 paisa; (USD 1=PKR 84.818)⁷¹
- Main exports: Textile products, rice, cotton, leather goods
- GNI per capita, PPP: US\$2,680 (World Bank, 2009)⁷²
- GDP (US\$ in millions): 161,990.0 (World Bank, 2009)
- Sex Ratio (males per 100 females): 108.5

⁷⁰ BBC News, "Pakistan country profile," No Author. Accessed 5 January 2011. Available http://news.bbc.co.uk/2/hi/south_asia/country_profiles/1157960.stm.

⁷¹ State Bank of Pakistan, No Author. Accessed 9 April 2011. Available <http://www.sbp.org.pk/>.

⁷² The World Bank, "World Bank Search: Pakistan flood losses," No Author. Accessed 27 March 2011. Available <http://search.worldbank.org/data?qterm=pakistan%20flood%20loss&language=EN&format=html>.

- GDP per Capita: \$1,013 (World Bank: Key Development Data & Development)
- Percentage of Population living on less than \$1.25 per day: 22.6% (UNDP: Human Development Report (HDR) 2009)



Figure 13. Map of Pakistan⁷³

A. HISTORICAL BACKGROUND OF FLOODS IN PAKISTAN

Pakistan has five main rivers the Indus River, which is one of the largest rivers of the world and the main river of the country originating from north of the Himalayas; the

⁷³ Geology.com, "Pakistan Map – Pakistan Satellite Image," No Author. Accessed 25 March 2011. Available <http://geology.com/world/pakistan-satellite-image.shtml>.

Jhelum River originating from Kashmir valley; the Chenab River originating from occupied Jammu and Kashmir; the Ravi River originating from the lesser Himalaya Range in India; and the Sutlaj River originating in Western Tibet in the Kailas Mountain range and near the source of River Indus. Pakistan also has a number of small rivers such as Kabul, Swat, Haro, Kunhar, Chitral, Tochi, Shah Alam, Naguman, Adezai, Soan, etc. All the rivers of the country have their origin in the north at higher altitudes and mainly derive their flows from monsoon rains and melting snow. There are two main dams built for water storage and power generation, the Tarbela Dam on the Indus River and the Mangla Dam on the Jhelum River; some smaller dams also exist on these rivers. There are around nineteen barrages on all the rivers for regulating the water for irrigation and controlling the flow of water during flood season as well. Some of the more important ones include Marala, Khanki, Qadirabad, Trimmu and Punjnad on the Chenab River, and Kalabgh, Chahsma, Taunsa, Guddu, Sakhur and Kotri on Indus River. Structures on Indus River system are shown schematically in Figure 14.⁷⁴

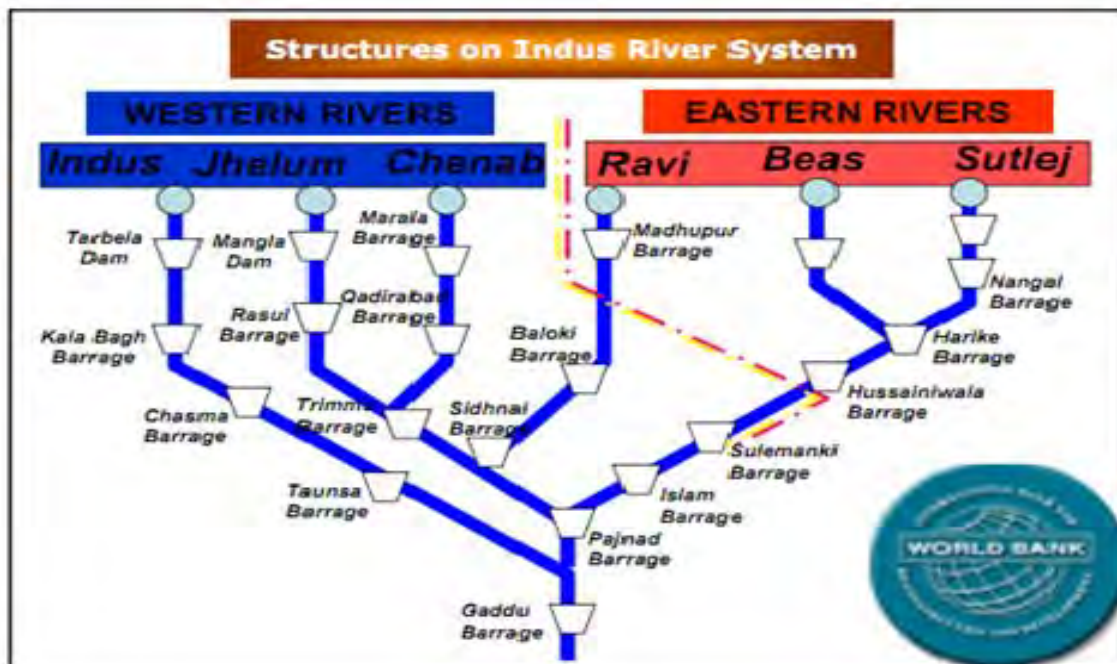


Figure 14. Structures on Indus River System

⁷⁴ NDMA-UNDP 5-Day Training Course on Flood Mitigation, "Pakistan's Indus River System," No Author, 15 February 2010. Accessed 5 April 2011. Available <http://ndma.gov.pk/Documents/NIDM/NIDM%20Courses/Flood%20Mitigation%2015-19%20Feb%202010/Pakistan%20Indus%20River%20System.pdf>.

Pakistan has been suffering flooding from the Indus River and its twenty seven major tributaries throughout its history and considers flooding to be the major natural calamity, which the country has been facing regularly at different times. The detail of damage it suffered due to flooding from 1955 to 2007 is shown in Table 3.

Year	Value of Property damaged (Rs in Millions)		Lives Lost	Villages Affected
	Unadjusted	Adjusted		
1950	199.80	11,282.00	2,190	10,000
1956	155.50	7,356.00	160	11,609
1957	152.50	6,958.00	83	4,498
1973	5,137.00	118,684.00	474	9,719
1976	5,880.00	80,504.00	425	18,390
1978	4,478.00	51,489.00	393	9,199
1988	6,879.00	25,630.00	508	1,000
1992	34,751.00	69,580.00	1,008	13,208
1995	6,125.00	8,698.00	591	6,85
2001	450.00	450.00	219	50
2003	5,175.00	5,175.00	484	4,376
2004	15.00	15.00	85	47
2005	Not Reported		59*	1,931
2007	Not Reported		1781+	2 million+ ⁷⁵

Table 3. Historical Flood Damages in Pakistan (1950–2007)⁷⁶

In Pakistan, flooding in rivers is generally caused by heavy rainfall in the catchments during the monsoon season, which is sometimes augmented by snowmelt flows as well. Monsoon currents originating in the Bay of Bengal and resultant depressions often cause heavy rains in the Himalayan foothills. These are additionally affected by weather systems from the Arabian Sea (by seasonal lows) and from the

⁷⁵ Wikipedia, “List of Floods in Pakistan,” No Author. Accessed 4 April 2011. Available http://en.wikipedia.org/wiki/List_of_floods_in_Pakistan#Historical_floods_in_Pakistan.

⁷⁶ Noreen Haider, “Living With Disasters: Disaster profiling of districts of Pakistan.” Accessed 4 April 2011. Available <http://www.ndma.gov.pk/Publications/livingwithdisasters.pdf>.

Mediterranean Sea (through westerly waves), which occasionally contribute in building up destructive floods in one or more of the main rivers of the Indus system. The formation of temporary natural dams by landslides or glacier movement and their subsequent collapse has also caused heavy floods in the country. Another factor is temperature obtaining in central Pakistan, which is southern Punjab, upper Sindh and northeastern Balochistan, during the monsoon months.⁷⁷

Because of regular floods in the region, Pakistan, soon after its creation in 1947, recognized the need for establishing an early flood forecasting and warning system. A fully fledged flood forecasting system (FFS) was in fact established after the country suffered devastating flooding in 1976. However, the system was further matured after learning lessons and exploring weaknesses during the floods of 1988, 1992, 1996 and 1997. Thus, the system went through many improvements over time and has now become sufficiently comprehensive; but it still needs much more concentrated efforts to make it more self contained and modernized. The following organizations have been established and/or equipped over time for early warning, forecasting and mitigation of floods in Pakistan:⁷⁸

- National Disaster and Management Authority (NDMA)
- Provincial Irrigation and Drainage Authority (PIDA)
- Water and Power Development Authority (WAPDA)
- Provincial Relief Organization
- Pakistan Army
- Pakistan Navy
- Commissioner for Indus Water (CIW)
- Emergency Relief Cell (ERC)
- Federal Flood Commission (FFC)
- Flood Forecasting Division (FFD)

⁷⁷ Haider, "Living With Disasters: Disaster profiling of districts of Pakistan."

⁷⁸ South Asian Floods (SAF), "Pakistan: An Introduction," No Author. Accessed 4 April 2011. Available http://southasianfloods.icimod.org/contents.php?country_code=PK&c_id=11.

B. FACTS ABOUT 2010 FLOOD IN PAKISTAN



Figure 15. Gushing Water in Swat Valley⁷⁹

Over the course of the monsoon season in July and August 2010, Pakistan experienced the worst floods recorded in its history. Heavy rainfall caused flash and riverine floods in the north and northwestern regions of Pakistan, including parts of the provinces of Khyber Pakhtunkhwa (KPK), Gilgit Baltistan (GB), Balochistan, and Azad Jammu and Kashmir (AJK) that combined to create a moving body of water equal in dimension to the land mass of the United Kingdom and travelling southwards. The high intensity rainfall in KPK generated unprecedented flood peaks in the Swat River. These floods severely damaged the Amandara Headworks and washed away the Munda Headworks, both major irrigation structures. The combined flow of the Swat and Kabul Rivers generated another unprecedented flood peak at the town of Nowshera, causing severe damage. The flood waters travelled downstream through the barrages in Punjab and Sindh until they reached the Arabian Sea downstream of the Kotri Barrage. Extreme high floods were recorded at the Chashma and Taunsa Barrages, and a near historic flood peak was also recorded at the Kotri Barrage. Many of the main irrigation canals that take water from the Indus River were also flooded, pouring water onto agricultural lands. This

⁷⁹ Pakistan Travel and Culture, "Flood in Pakistan Scientific Facts and History," No Author, 20 August 2010. Accessed 4 April 2011. Available <http://blog.travel-culture.com/2010/08/20/flood-in-pakistan-scientific-facts-and-history/>.

situation was compounded by additional heavy rains, and the breaching of major canals and embankments and diversion of the water in an attempt to prevent flooding of the urban areas.⁸⁰

1. Important Facts and Figures of the Floods

Some important facts and figures to highlight the losses and damage caused by the floods are appended below:⁸¹⁻⁸²

- Population affected: 20,184,550 (approx)
- Deaths 1,985
- Injured 2,946
- Household Damage 1,744,471
- Area impacted: 150,000 sq. km
- Seventy eight of country's 141 districts affected
- 3.4 million children under five years of age were among the affected
- 600,000 expectant or lactating mothers
- 6.2 million consultations by September 20, 2010 for skin diseases, acute respiratory infections, acute diarrhea, suspected malaria and bloody diarrhea
- 12,516 school facilities either partially or fully damaged
- Five hundred health facilities out of 2,957 damaged or destroyed
- 1.66 million homes damaged or destroyed
- Seventeen million acres (out of total of 43 million acres) of farmland impacted
- Nine million acres of standing crops lost

⁸⁰ Reliefweb, "Pakistan Floods 2010: Preliminary Damage and Needs Assessment," No Author, p.19. Accessed 2 April 2011. Available [http://www.reliefweb.int/rw/RWFiles2010.nsf/FilesByRWDocUnidFilename/MUMA-8B68ST-full_report.pdf/\\$File/full_report.pdf](http://www.reliefweb.int/rw/RWFiles2010.nsf/FilesByRWDocUnidFilename/MUMA-8B68ST-full_report.pdf/$File/full_report.pdf).

⁸¹ Data provided by Head of Chancery at Embassy of Pakistan, Washington DC during meeting on 24 February 2011.

⁸² Pakistan Floods, No Author. Accessed 27 March 2011. Available <http://www.pakistanfloods.pk/daily-updates/situation-report>.

- One million tons of stored grain lost
- Planting of winter crops became difficult in affected areas because of water logged soil, and lack of seed and fertilizer
- More than 1.2 million large and small animals killed and 6 million poultry lost (Department of Livestock)
- More than 5,000 miles of roads and railways have been washed away⁸³

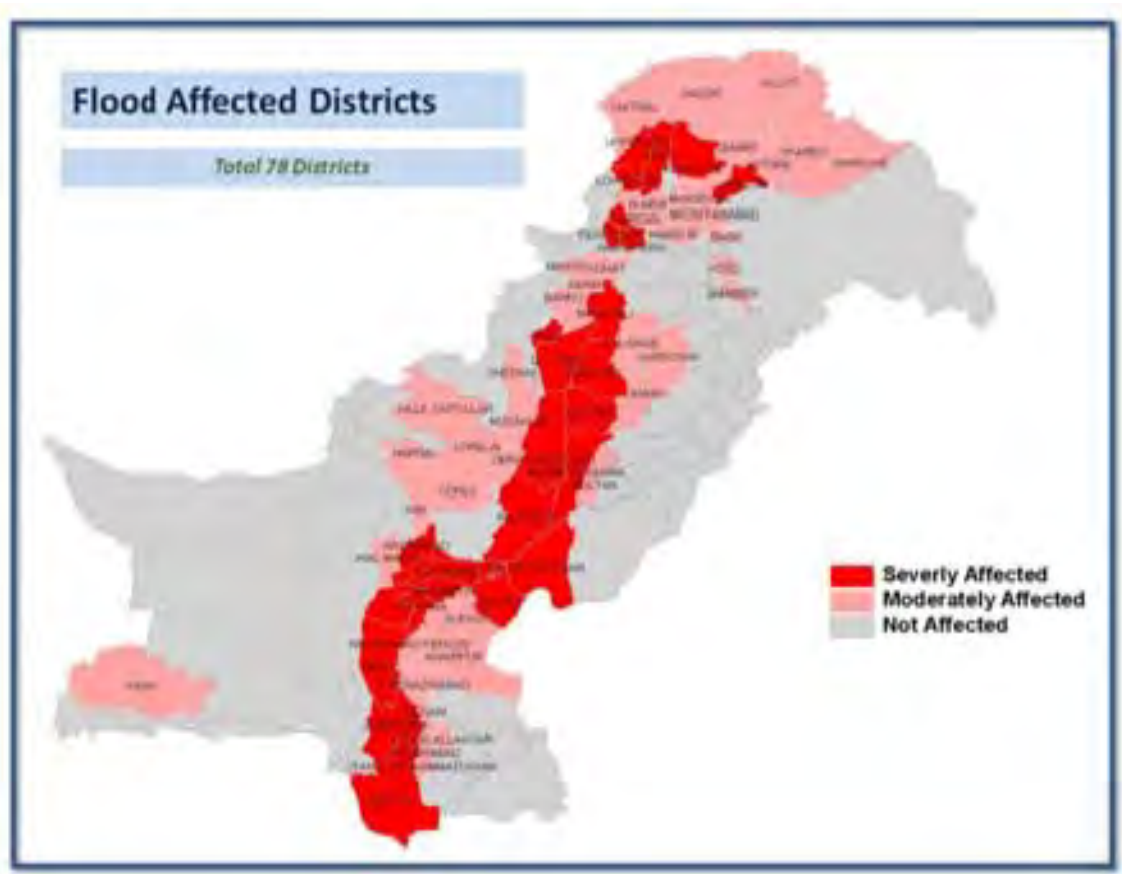


Figure 16. Flood Affected Districts⁸⁴

⁸³ MCEER, "Pakistan Floods 2010: Latest Facts, News, Photos & Maps," No Author. Accessed 27 March 2011. Available <http://mceer.buffalo.edu/infoservice/disasters/pakistan-floods-2010.asp>.

⁸⁴ Data provided by Head of Chancery at Embassy of Pakistan, Washington DC during meeting on 24 February 2011.

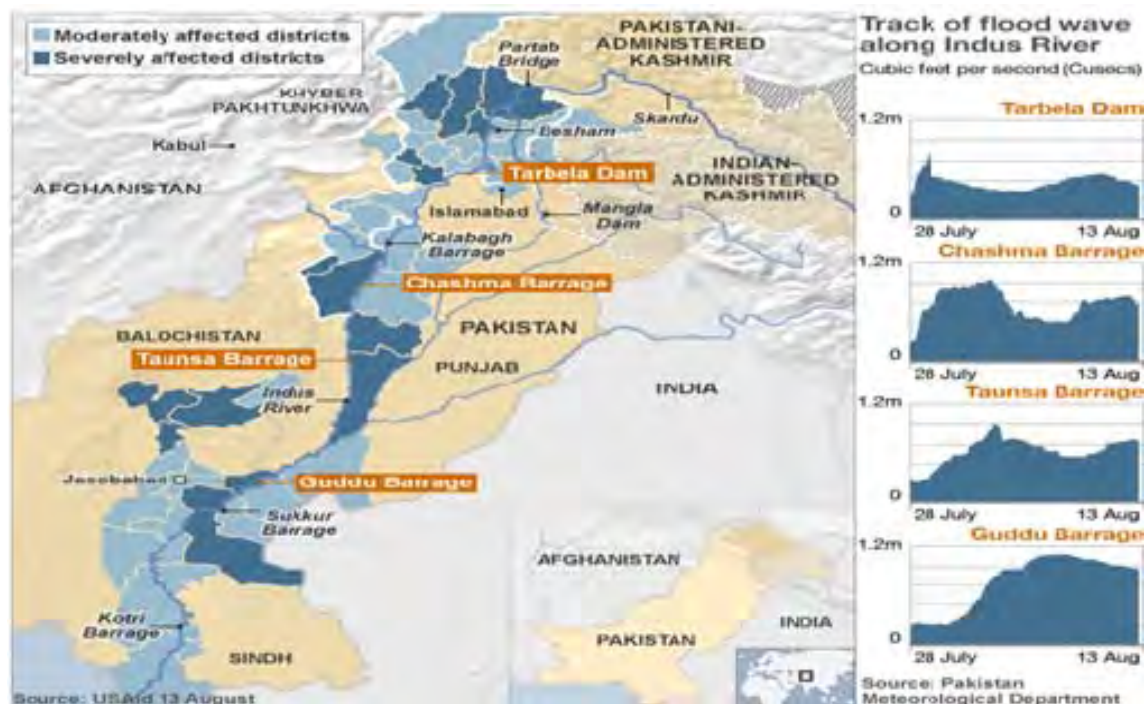


Figure 17. Pakistan Floods: Map and Graphics⁸⁵

A summary of damages to provinces is shown in Table 4:

PROVINCES/REGIONS	DEATHS	INJURED	HOUSES DAMAGED	POPULATION AFFECTED
KPK	1,156	1,198	284,990	3,800,000
PUNJAB	110	262	497,700	8,200,000
SIND	411	1,235	876,194	7,356,550
BAL	54	104	75261	700,000
AJK	71	87	7108	200,000
GB	183	60	2820	100,000
TOTAL	1,985	2,946	1,744,471	20,184,550

Table 4. Province wise Summary of Damages/Losses⁸⁶

⁸⁵ BBC News, "Pakistan Floods : Maps and Graphics," No Author, updated 16 August 2010. Accessed 27 March 2011. Available <http://www.bbc.co.uk/news/world-south-asia-10986220>.

⁸⁶ NDMA Pakistan, "Pakistan Floods-Summary of Damages."

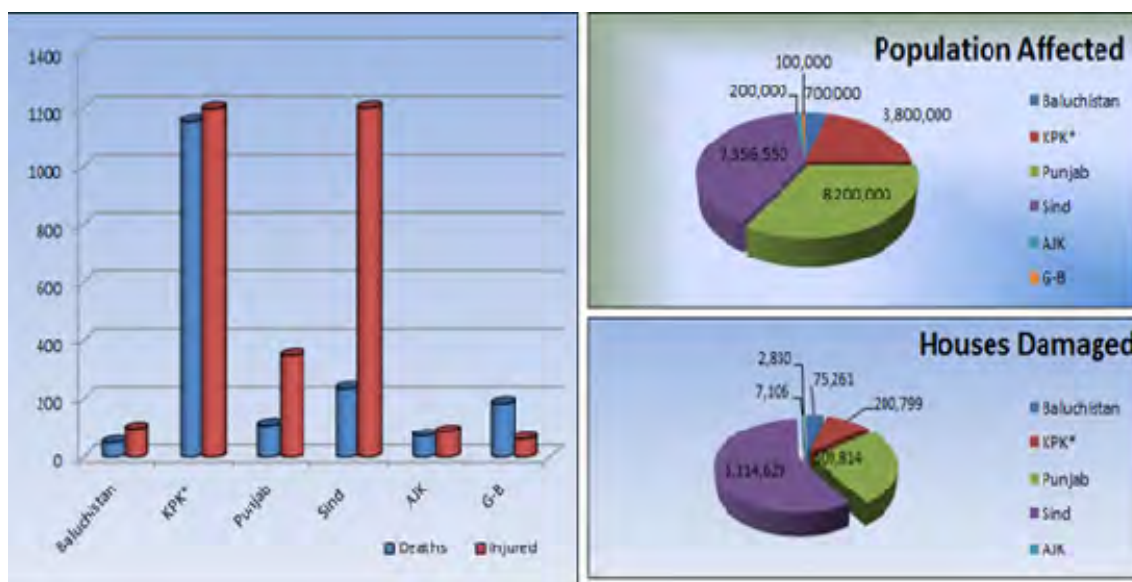


Figure 18. Province wise Comparison of Losses⁸⁷

The World Bank and Asian Development Bank did an initial Damage Needs Assessment (DNA) and estimated the direct damage caused by floods to be US\$6.5 billion while indirect losses amount to US\$3.6 billion. The agriculture, livestock, and fisheries sector suffered the highest damages. The estimate of total damage costs by sector is shown in Table 5. The estimated overall recovery and reconstruction cost associated with the floods was at approximately US\$8.74 – 10.85 billion, which included estimated costs for relief, early recovery, and medium to long term reconstruction. The cost for relief was estimated to be US\$928 million, for early recovery US\$956 million, and for reconstruction US\$6,799 – 8,915 million.⁸⁸

⁸⁷ Data provided by Head of Chancery at Embassy of Pakistan, Washington DC during meeting on 24 February 2011.

⁸⁸ Reliefweb, "Pakistan Floods 2010: Preliminary Damage and Needs Assessment," No Author, p.13. Accessed 2 April 2011. Available [http://www.reliefweb.int/rw/RWFiles2010.nsf/FilesByRWDocUnidFilename/MUMA-8B68ST-full_report.pdf/\\$File/full_report.pdf](http://www.reliefweb.int/rw/RWFiles2010.nsf/FilesByRWDocUnidFilename/MUMA-8B68ST-full_report.pdf/$File/full_report.pdf).

Sector	Direct Damages PKR millions	Indirect Losses PKR millions	Total Damage	
			PKR millions	USD millions
1. Social Infrastructure				
Housing	91,843	43,171	135,014	1,588
Health	1,562	2,661	4,222	50
Education	22,047	4,418	26,464	311
Subtotal	115,451	50,249	165,700	1,949
2. Physical Infrastructure				
Irrigation & Flood Management	23,600		23,600	278
Transport & Communications	62,491	50,420	112,911	1,328
Water Supply & Sanitation	3,194	6,112	9,306	109
Energy	13,184	13,116	26,300	309
Subtotal	102,469	69,648	172,117	2,025
3. Economic Sectors				
Agriculture, Livestock & Fisheries	315,547	113,257	428,805	5,045
Private Sector & Industries	14,463	9,468	23,932	282
Financial Sector	110	57,141	57,251	674
Subtotal	330,120	179,866	509,987	6,000
4. Cross Cutting Sectors				
Governance	3,141	2,835	5,976	70
Environment	992		992	12
Subtotal	4,133	2,835	6,968	82
Total	552,173	302,599	854,771	10,056

Table 5. Estimate of Total Damage Costs by Sector

The full extent of the damage caused by floods still cannot be completely quantified and assessments are ongoing. The direct and future losses are likely to affect millions of people at the household level, as well as impact national productive capacity.

2. Temporal Analysis of Flooded Districts

Temporal Analysis of Flooded Districts from July 30, 2010 to September 13, 2010 is shown in Figure 19.⁸⁹

⁸⁹ HumanitarianResponse Pakistan, "Pakistan-Revised Floods Emergency Response Plan," No Author, Sep 2010. Accessed 29 March 2011. Available at http://www.pakresponse.info/Portals/0/Pakistan/PFERP2010/Final_FERP_Sept2010.pdf.

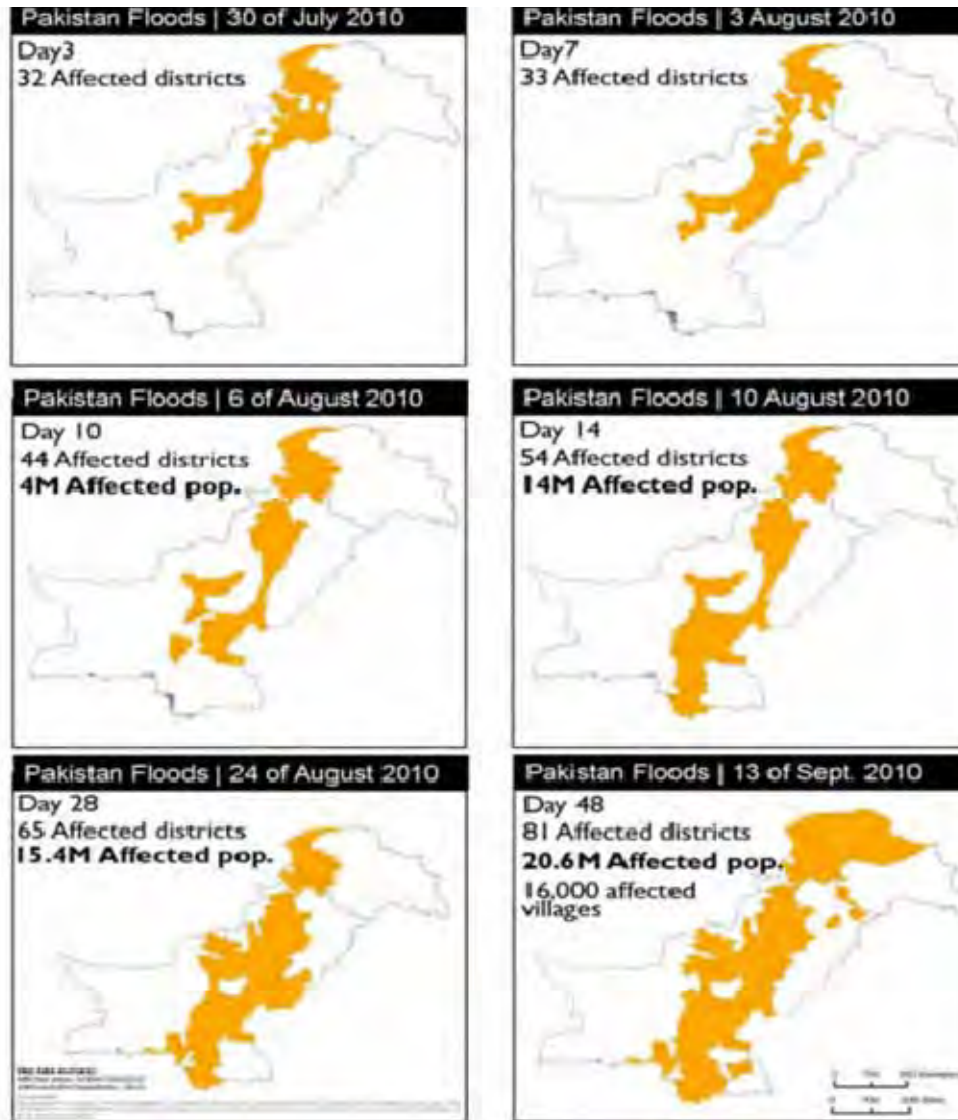


Figure 19. Temporal Analysis of Flooded Districts

3. Comparing Pre- and Post-disaster Images

The satellite images in Figure 20 show how the Pakistan flood waters have swollen the lower Indus River, completely filling the river valley, when compared with images of the same area before the floods hit those areas. The flow through the Barrages

has exceeded the limit of water for, which these are designed.^{90,91} Figures 21 – 23 show before and after pictures of flooding at a few Barrages. Figures 24 and 25 show some other places before and after river flooding.

11 August 2009



10 August 2010



Figure 20. Comparing Satellite Images of Indus River Flooding

⁹⁰ BBC News, “Pakistan Floods : Maps and Graphics,” No Author, updated 16 August 2010. Accessed 27 March 2011. Available <http://www.bbc.co.uk/news/world-south-asia-10986220>.

⁹¹ Data provided by HOC at Embassy of Pakistan, Washington DC during meeting on 24 February 2011.



Figure 21. Taunsa Barrage (Left: Pre-flood on July 11, 2010; Right: Post-flood on August 12, 2010)

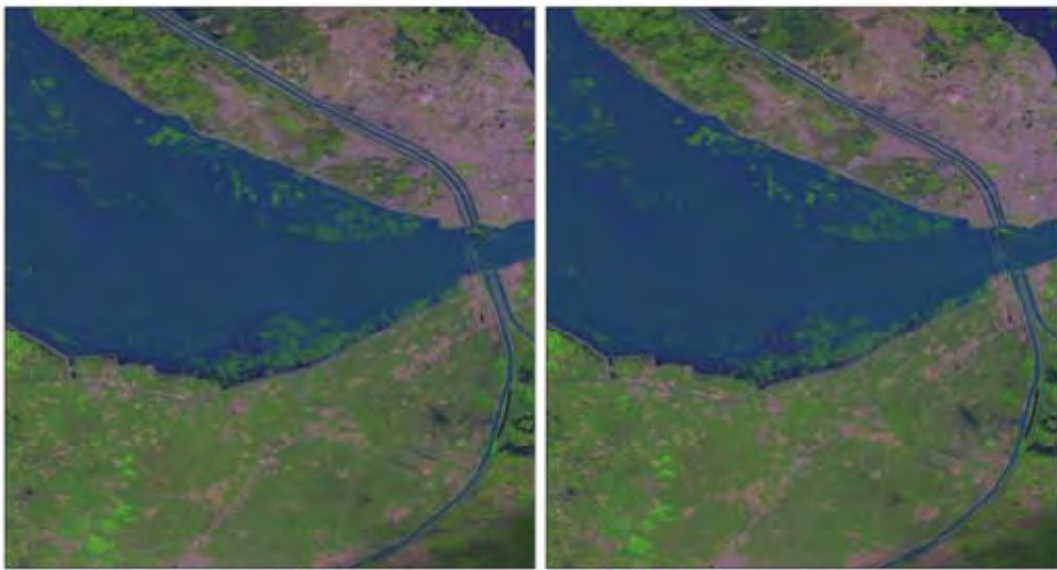


Figure 22. Sukkur Barrage (Left: Pre-flood on May 16, 2010; Right: Post-flood on August 13, 2010)

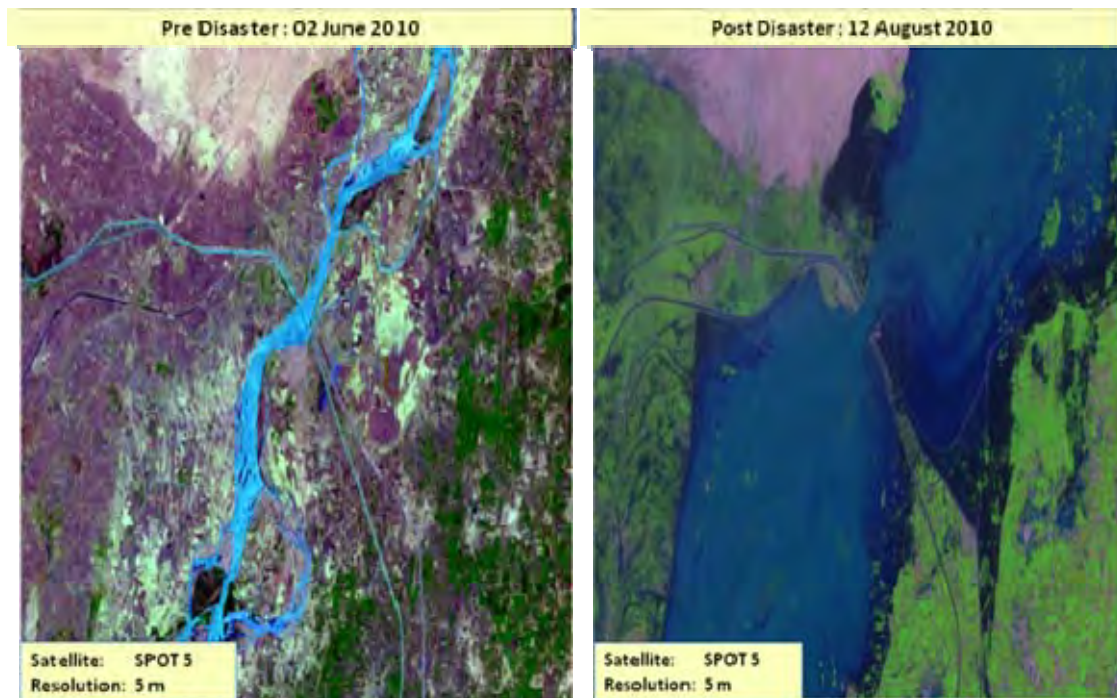


Figure 23. Guddu Barrage (Left: Pre-flood on June 2, 2010; Right: Post-flood on August 12, 2010)



Figure 24. Indus River (Left: Pre-flood on June 7, 2010; Right: Post-flood on August 17, 2010)

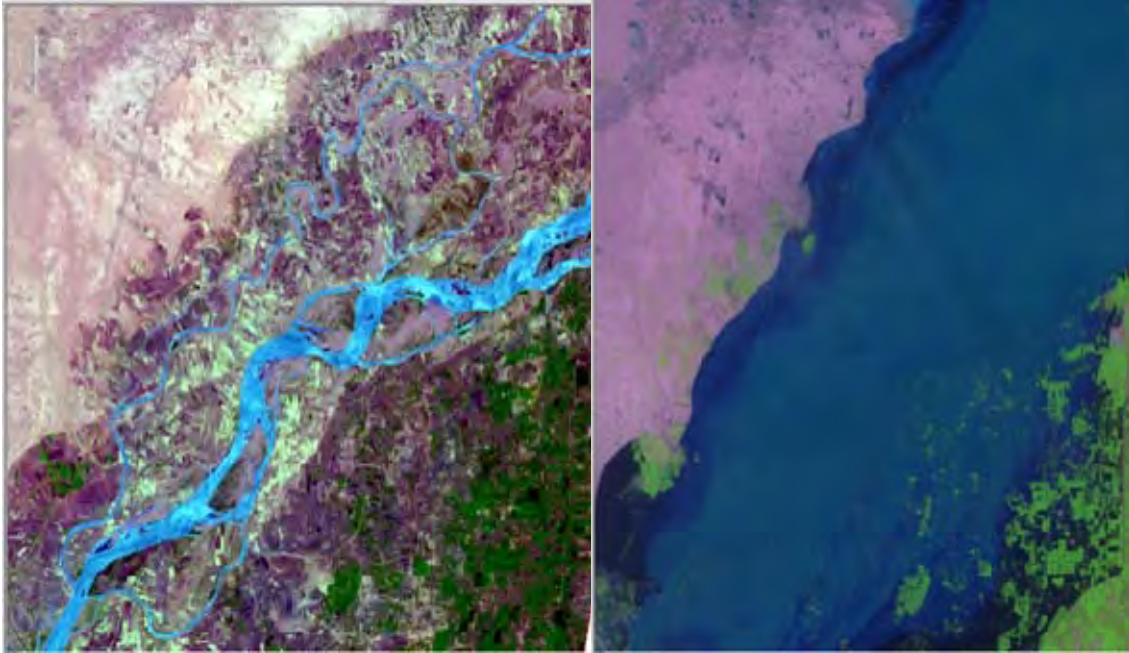


Figure 25. Rajanpur (Left: Pre-flood on June 1, 2010; Right: Post-flood on August 12, 2010)

Figures 26 – 28 are some of the pictures showing the gruesome situation on the ground after the floods hit different parts of the country.⁹²



Figure 26. A Flooded Village and a Factory

⁹² NDMA Pakistan, “Pakistan Floods-Summary of Damages.”



Figure 27. UN Secretary General Ban Ki-moon's Visit to Flood Affected Areas



Figure 28. Pakistan Military Engaged in Rescue and Relief Work

C. NATURE OF RESPONSE FROM WITHIN THE COUNTRY

1. Role of the Civil Government

After suffering from a massive earthquake in 2005, the government of Pakistan established comprehensive organization at the federal, provincial and district levels to

help reduce effects of any disaster and take control of the situation in case of any disaster. The leading authority is the National Disaster Management Commission, which is headed by the Prime Minister, followed by the National Disaster Management Authority (NDMA) headed by a retired army Lieutenant General, Provincial Disaster Management Authorities (PDMAs) and District Disaster Management Authorities (DDMAs). Disaster Risk Management (DRM) in Pakistan is responsible for management of floods including preparedness, response/recovery and mitigation measures. The National Disaster Management Commission (NDMC) is to address the issues of disaster risk reduction and preparedness in a comprehensive manner. The National Disaster Management Authority (NDMA) has been tasked to implement the policies, strategies and programs for Disaster Risk Management developed by the NDMC, with a view to ensure reduction in disaster risks, and to enable the country to tackle any disaster in an organized and efficient manner.⁹³

In the case of the 2010 floods, NDMA was the lead authority in managing effective coordination among all the stake holders, which included federal government, provincial governments, both local and international NGOs, and other actors involved in the relief operations. It was also responsible for providing support and help in the distribution of relief goods such as food, blankets, tents, and tons of other items collected throughout the country to the affected people. Call centers were established to receive and respond to emergency calls. Simultaneous work was undertaken to strengthen banks vulnerable to floods. In some places, breaches were engineered to control floods and disrupted communication networks were quickly restored by temporary structures.

In a relatively short span of time, considering the scale of disaster, the situation has fairly normalized. Currently, only 236,889 acres of land is submerged and a majority of the affected population living in the relief camps has returned to their homes. Repatriation of people in Punjab, Khyber Pakhtoonkhwa (KPK), Azad Jammu and Kashmir (AJ&K) and Gilgit Biltistan (GB) provinces is 100%, whereas in Sindh it is

⁹³ National HEPRN, Ministry of Health Website, "GOVERNMENT OF PAKISTAN: National Health Emergency Preparedness and Response Network," No Author. Accessed 28 March 2011. Available <http://www.nhepr.org/index.php?id=4>.

95% and in Baluchistan it is 84%. In aggregate, there were a total of 5,928 camps housing more than 3 million affected people; but presently only 115 camps are left with only 123,008 people living in them with a 96% aggregate repatriation ratio.⁹⁴ The state of these relief camps is shown in Figure 29.

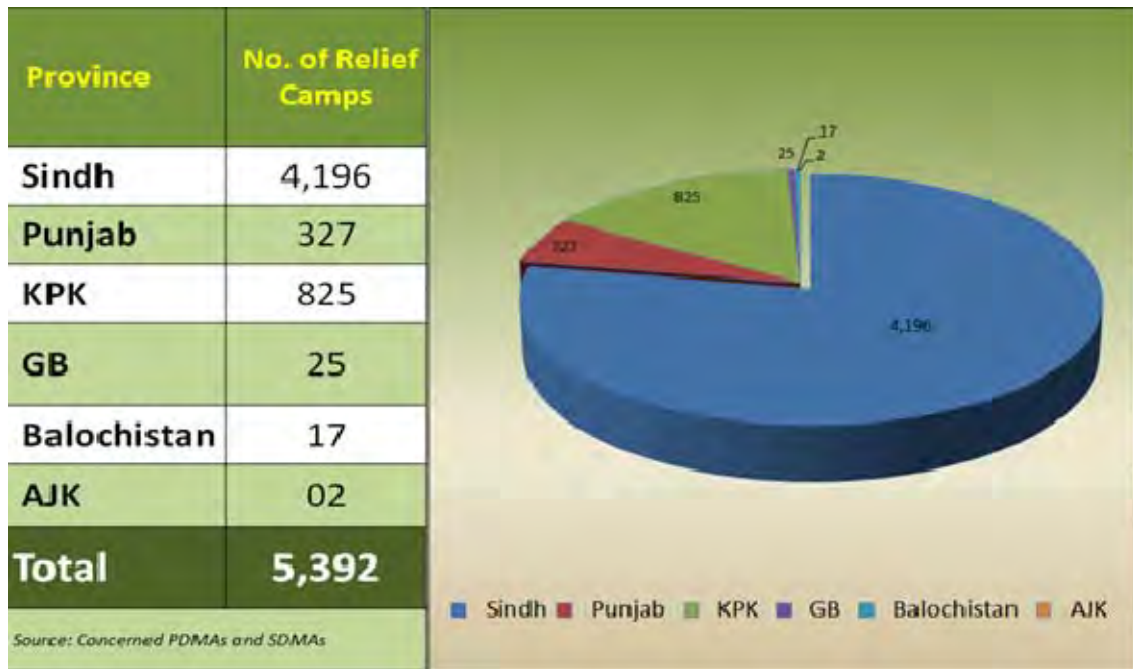


Figure 29. State of Relief Camps

To provide relief to the people and help them settle and restart their businesses, government introduced the Watan card scheme. Under this scheme, the displaced people were registered by National Database and Registration Authority (NADRA) and issued Watan debit cards, valued at approximately \$230 each, in phases depending on the availability of funds for disbursement. In the Punjab province a total of 608,824 Watan cards have been processed and an amount of Rs. 11,966,034,234 have been disbursed; in Sindh 553,096 Watan cards have been processed with a total of Rs. 10,086,363,450 disbursed; in KPK 198,408 Watan cards have been processed and Rs. 3,845,856,591 have been disbursed; in Baluchistan 101,700 Watan cards have been processed and Rs. 1,811,622,486 have been disbursed; in AJ&K 9,961 Watan cards have been processed

⁹⁴ NDMA, "News Room," No Author, 12 February 2011. Accessed 29 March 2011. Available http://www.ndma.gov.pk/news_room.html.

and Rs. 185,412,500 have been disbursed; and in Gilgit Baltistan 3,258 Watan cards have been processed and Rs. 61,216,000 have been disbursed. In this regard, a total of 1,475,247 Watan Cards have been processed and a total amount of Rs. 27,956,505,262 (approximately \$32.7 million) has been disbursed among the affected.⁹⁵

No major outbreak of any epidemic was reported in any part of the country. However, four major diseases were reported in the affected areas: ARI (Acute Respiratory Infections), skin diseases, acute diarrhea, and suspected malaria. At the peak, 33% cases of ARI were reported while currently the rate has gone down to 31%; skin disease cases reported were 12% while by February 2011 it has come down to 9%; acute diarrhea cases initially reported were 12%, which have also reduced to 6%; and suspected malaria cases have reduced from initial reports of 7% to 5% only. These figures indicate an improvement in the health scenario in the flood hit areas.⁹⁶

Around 80 percent of people in the affected areas depend on agriculture to provide for their families. A large majority lost their immediate and future sources of food and income, such as standing crops, seed stocks, livestock, fishery assets, farming equipment and tools. The Rabi cropping (the crops that are sown in the winter season) for the year 2010/11 is 1 – 2 % higher than the targets. In the flood affected districts, the Rabi coverage is 60 – 100% than that of the preceding year.⁹⁷

2. Role of Pakistan Armed Forces

Pakistan armed forces were the main tool available to the federal government to be employed in rescue and relief works. In spite of the fact that half of the Pakistan Army remained committed to combat terrorists, over 60,000 troops were committed for the rescue and relief activities throughout the affected areas. The Pakistan Navy and Air Force also contributed proportionately in the rescue and relief operation. The armed forces of Pakistan had been the most effective, organized and committed element of the

⁹⁵ NDMA, “News Room,” No Author, 12 February 2011. Accessed 29 March 2011. Available http://www.ndma.gov.pk/news_room.html.

⁹⁶ Ibid.

⁹⁷ Ibid.

government to undertake the rescue and relief operation. They were able to manage the relief and rescue work in an efficient manner and were appreciated by the affected people, national political and government leadership, international donors, NGOs, and media.⁹⁸

Some of the armed forces' contributions in the flood relief and rescue campaign are highlighted below:⁹⁹

- 68,000 tons of rations were collected and distributed, including 2,300 tons of rations from the Army's own quota.
- 60,000 Army troops were employed in rescue and relief operations.
- Fifty two helicopters were used for transporting critical relief supplies to cut off areas.
- Over one hundred Army Relief Camps were established across the country.
- Around 1.4 million people were rescued.
- 1,500,000 (1.5 M) packets of cooked food were distributed to the affected people.
- More than 1,000 boats including navy hovercrafts and other vessels were used in the rescue operations.
- Pakistan Armed Forces personnel donated their salary for one day to flood affected people.
- The Army's veterinary mobile teams were deployed for vaccinating animals in the affected areas to save their lives.
- Pakistan Navy marines rescued around 223,000 personnel. The Navy established five relief camps with a medical camp and an elementary school being integral components, and medical treatment was provided to 46,378 people. The Navy distributed 1,145 tons of rations and also

⁹⁸ Raja Muhammad Khan, "The Role of armed forces during floods," The NEWS, 10 September 2010. Accessed 5 April 2011. Available <http://thenews.com.pk/TodaysPrintDetail.aspx?ID=4084&Cat=2&dt=9/11/2010>.

⁹⁹ ISPR, "Pakistan Army's Flood Relief Efforts," No Author. Accessed 5 April 2011. Available http://www.ispr.gov.pk/front/main.asp?o=t-real_story&id=16&search=1.

constructed a model village comprising forty houses and has further plans to construct more such villages.¹⁰⁰

- Pakistan Air Force dedicated all its C-130s for the transportation of relief goods and evacuation of personnel from affected areas.

3. Role of the Civil Society

During the disaster the civil society in Pakistan acted very swiftly and tried to reach each and every part of the affected area. Political parties and humanitarian relief organizations joined hands with the government in establishing relief camps for displaced people, providing them clean drinking water, food, milk for kids, wood for cooking, medicines, tents, clothing and other items of necessity. They had also been engaged in providing seeds, fertilizer and other equipment to farmers so they can start their business. Youth organizations were engaged in collecting donations for flood affected people and were able to collect a good amount of cash as well as relief goods like blankets, food items, and clothing.¹⁰¹ These organizations and volunteer groups were able to help hundreds of thousands of flood victims with different food items, medical treatment through free medical camps, hygiene kits (including soap, towels, surf, sanitary pads, women undergarments, etc.), kitchen sets (crockery, water cans), temporary toilets, filter units to clean water, stoves for cooking, dry milk, biscuits, grains, oil, sugar, vaccinations for water borne diseases, beds, feeders and pampers for children, candles, water purification sachets, tea, spices, rice bags, and tons of other items, which were needed.¹⁰² In addition, some NGOs established child friendly and female friendly areas as a comfort haven for children and women to interact among themselves. The private

¹⁰⁰ Pakistan Navy, "Pakistan Navy Rehabilitation Efforts Floods 2010," No Author. Accessed 5 April 2011. Available <http://www.paknavy.gov.pk/rehab.htm>.

¹⁰¹ Waleed Tariq, "Civil Society takes charge of flood relief work," Pakistan Eye, 7 September 2010. Accessed 5 April 2011. Available <http://local.citizenseye.com/pakistan/2010/09/civil-society-takes-charge-of-flood-relief/>.

¹⁰² Pakistanflood.org, "Pakistan Flood: Member Associates of FPCCI- Flood Relief Activities," No Author. Accessed 5 April 2011. Available <http://www.pakistanflood.org/category/organizations-on-the-ground/on-ground-needs/>.

sector, which includes individuals, corporations and foundations, contributed over US\$17 million to the flood relief effort, with the majority of the funds passed on to various UN organizations and NGOs.¹⁰³

D. RESPONSE FROM THE INTERNATIONAL COMMUNITY

1. Response by the United Nations and the International Community

Response from the international community was very slow in the beginning and only \$3.20 was committed per flood affected person within ten days of the disaster, as compared to \$70 committed per person within ten days of the Pakistan earthquake and \$495 per person within ten days of the Haiti earthquake.¹⁰⁴ Figure 30 shows per capita assistance within the first 10 days of crises. As the effects of the floods became evident, the international community started to respond more seriously. There were approximately 2,500 international troops deployed in support of the relief efforts, and financial and technical assistance to the Government of Pakistan (GoP) was also offered by a number of countries.

In August 2010, the UN launched an initial appeal for US\$459.7 million to finance Pakistan's Initial Flood Emergency Response Plan. This was followed by the September 17, 2010 launch of the UN's largest ever humanitarian appeal for US\$2.07 billion to finance projects supporting essential sectors such as shelter, food, water, sanitation, hygiene, and agriculture for a period of twelve months.¹⁰⁵ UN Secretary General Ban Ki moon visited the flood affected areas of Pakistan in August 2010, followed by a number of other high ranking UN officials such as The Emergency Relief Coordinator, Executive Director of the World Food Program (WFP), the United Nations

¹⁰³ Reliefweb, "Pakistan Floods 2010: Preliminary Damage and Needs Assessment," No Author, p.20. Accessed 2 April 2011. Available [http://www.reliefweb.int/rw/RWFiles2010.nsf/FilesByRWDocUnidFilename/MUMA-8B68ST-full_report.pdf/\\$File/full_report.pdf](http://www.reliefweb.int/rw/RWFiles2010.nsf/FilesByRWDocUnidFilename/MUMA-8B68ST-full_report.pdf/$File/full_report.pdf).

¹⁰⁴ Data provided by HOC at Embassy of Pakistan, Washington DC during meeting on 24 February 2011.

¹⁰⁵ UN News Centre, "Pakistan: UN issues largest-ever disaster appeal at over \$2 billion for flood victims," No Author, 17 September 2010. Accessed 28 March 2011. Available <http://www.un.org/apps/news/story.asp?NewsID=35983&Cr=pakistan&Cr1=>.

High Commissioner for Refugees, Directors General of the World Health Organization (WHO), and the Food and Agriculture Organization of the United Nations (FAO) to show solidarity and commitment to the disaster.¹⁰⁶

Pledges from sixty eight bilateral and multilateral donors totaling US 1.87 billion in the form of grants and in kind contributions were committed by October 2010 to the government for the relief and early recovery phases.¹⁰⁷

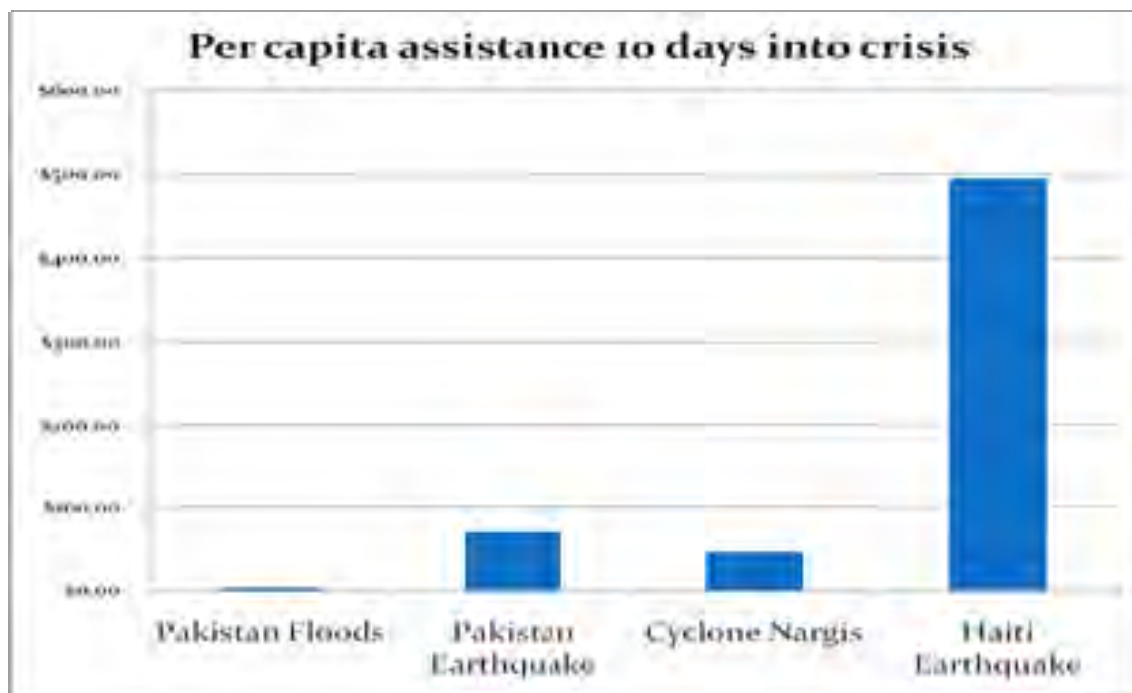


Figure 30. Per Capita Assistance Ten Days into Crises¹⁰⁸

As of April 5, 2011, 67% of funding amounting to \$1,306,514,859 against the required amount of \$1,963,473,246 has been received against Pakistan Floods Relief and

¹⁰⁶ United Nations General Assembly, Report of the Secretary General, "Strengthening emergency relief, rehabilitation, reconstruction and prevention in the wake of devastating floods in Pakistan," No Author, 7 March 2011. Accessed 9 April 2011. Available http://www.un.org/ga/search/view_doc.asp?symbol=A/65/773.

¹⁰⁷ Reliefweb, "Pakistan Floods 2010: Preliminary Damage and Needs Assessment," No Author, p.20. Accessed 2 April 2011. Available [http://www.reliefweb.int/rw/RWFiles2010.nsf/FilesByRWDocUnidFilename/MUMA-8B68ST-full_report.pdf/\\$File/full_report.pdf](http://www.reliefweb.int/rw/RWFiles2010.nsf/FilesByRWDocUnidFilename/MUMA-8B68ST-full_report.pdf/$File/full_report.pdf).

¹⁰⁸ Data provided by HOC at Embassy of Pakistan, Washington DC during meeting on 24 February 2011.

Early Recovery Response Plan 2010, and still 33% amounting to \$653,958,387 are unmet.¹⁰⁹ In Pakistan, Humanitarian Response Plan funding received as of April 5, 2011 is approximately 50%, amounting to \$330,088,035 against the requirement of \$661,180,978, and \$331,092,943 are still unmet.¹¹⁰ An amount of \$36,635,196 has been donated in the Emergency Response Fund for Pakistan by different countries to fill critical funding gaps and to ensure most urgent actions have enough resources at the onset of crises. Around US\$29 million had been allocated to one hundred projects including those in flood affected provinces.¹¹¹

As of April 5, 2011, funding outside the appeal like bilateral aid programs, private donations, in kind donations and funding to the International Red Cross and Red Crescent Movement had surpassed US\$1.1 billion.¹¹²

As of January 31, 2011, approximately six million people had received food assistance in monthly rations, over 385,000 metric tons of food was distributed, 9.3 million people had essential medication needs covered, medical attention had been provided to nearly 10 million people, and almost 900,000 households had been provided with emergency shelter. Access to safe water was provided through rehabilitated water systems for 4.7 million people and through water trucking to 4.57 million people. Countrywide, the nutrition cluster reported that over 750,000 children under age five had been screened and 31,000 severely malnourished children and about 70,000 moderately malnourished children had been admitted into therapeutic programs or feeding programs, while 39,000 pregnant and lactating women were admitted into the supplementary feeding programs across the country. The logistics cluster had processed 80,000 cubic meters of relief cargo, and over 11,900 metric tons of relief cargo had been airlifted.

¹⁰⁹ Humanitarian Response Pakistan, "Pakistan Floods-2010," No Author. Accessed 5 April 2011. Available <http://pakresponse.info/Default.aspx?tabid=93>.

¹¹⁰ Ibid.

¹¹¹ Ibid.

¹¹² Ibid.

Temporary learning centers provided education to more than 220,000 children (including 96,000 girls) and more than 400,000 children were enrolled in child friendly spaces.¹¹³

The summary of the total funding status of countries/organizations' commitments and pledges in the form of cash donations and relief goods for different clusters as appealed by the United Nations is appended in Table 6. The table provides a summary of total funding status as of April 5, 2011.¹¹⁴

Total Commitment		\$3042 million
Cash	Committed Pipeline	\$1618.86 million
	Disbursed	\$475.78 million
Soft Loans	Committed	\$243.00 million
	Disbursed	0.00
In Kind	Committed Pipeline	\$539.87 million
	Delivered	\$185.11 million
Implementing Agency wise total commitment	UN/INGOs	\$2346.10 million
	GoP	\$696.64 million

Table 6. Status of Funding by Countries/Organizations

2. U.S. Assistance

The U.S. has been the major contributor so far and has provided around 29% of all assistance delivered to Pakistan. The U.S. is providing \$571.6 million through different channels, such as \$305M through USAID/OFDA, \$141M through USAID/FFP, \$10M through USAID/Pakistan Assistance (KLB), \$70M through Pakistan Early Recovery Assistance and \$49M through State Assistance.¹¹⁵ There were several

¹¹³ United Nations General Assembly, Report of the Secretary General, "Strengthening emergency relief, rehabilitation, reconstruction and prevention in the wake of devastating floods in Pakistan," No Author, 7 March 2011. Accessed 9 April 2011. Available http://www.un.org/ga/search/view_doc.asp?symbol=A/65/773.

¹¹⁴ Government of Pakistan, Ministry of Economics and Statistics, "Country wise update of Foreign Assistance for Flood Affecteds," No Author. Accessed 27 March 2011. Available http://202.83.164.27/wps/portal/Moeas/!ut/p/c1/04_SB8K8xLLM9MSSzPy8xBz9CP0os_hQN68AZ3dnIwML82BTAYNXTz9jE0NfQwNDE_1wkA6zeAMcwNFA388jPzdVvyA7rxwAicV1Mg!!/dl2/d1/L2dJQSEvUUt3QS9ZQnB3LzZfT0ZMTzIGSDIwT0cwRjAyRENBRDNGMzNRTjM!/?WCM_GLOBAL_CONTEXT=/wps/wcm/connect/MoeasCL/ministry/highlights/country+wise+update+of+foreign+assistance+for+flood+affecteds.

¹¹⁵ Ibid.

USAID/OFDA funded international and UN organizations engaged in the relief operations, and also USAID/OFDA NGO grantees have expanded relief activities further into affected areas. The U.S. has provided other civilian and military in kind assistance in the form of halal meals, prefabricated steel bridges and other infrastructure support, as well as air support to and within Pakistan to transport goods and rescue people, valued at approximately \$20 million.¹¹⁶ The U.S. also provided thirteen mobile water treatment units, each with the capability to produce enough clean water for 20,000 people a day; twelve 12,000 liter water bladders for the storage of clean water; 208,750 x 10 liter water containers; 15 million water purification tablets (sufficient to chlorinate 150 million liters of water); 58 Zodiac inflatable rescue boats; 96 concrete saws and saw blades; 237,005 blankets; and 12,113 rolls of plastic sheeting for the construction of temporary shelters. The USS Peleliu was tasked to support the Pakistani government as needed and provided additional heavy air lift capability in the form of two CH-53E Super Stallion helicopters. A total of nineteen helicopters were provided for humanitarian relief efforts to operate in partnership with Pakistan military throughout the flood impacted areas.¹¹⁷ By the end of operations, U.S. helicopters flew more than 26 million pounds of relief supplies and rescued more than 40,000 people. In addition to the humanitarian airlift assistance, U.S. monetary aid for flood relief has topped half a billion dollars.¹¹⁸

¹¹⁶ Data provided by HOC at Embassy of Pakistan, Washington DC during meeting on 24 February 2011.

¹¹⁷ NAVY.mil, "Helicopters Launch from USS Peleliu in Support of Pakistan Relief Efforts," No Author, 12 August 2010. Accessed 27 March 2011. Available http://www.navy.mil/search/display.asp?story_id=55268.

¹¹⁸ Embassy of The United States of America at Islamabad, Pakistan Website, Press release, No Author, 2 December 2010. Accessed 27 March 2011. Available <http://islamabad.usembassy.gov/pr-10120201.html>.

E. FACTS ABOUT PAKISTAN'S EARTHQUAKE IN 2005



On October 8, 2005, at 08:50:40 AM a powerful earthquake of magnitude 7.6 hit the northern part of Pakistan with its epicenter at latitude $34^{\circ} 29' 35''\text{N}$ and longitude $73^{\circ} 37' 44''\text{E}$, a distance about 19 km (11.8 miles) northeast of Muzaffarabad, AJ&K (Pakistan), and 100 km (65 miles) north northeast of Islamabad (Pakistan). The hypocenter was located at a depth of 26 km (16.2 miles) below the surface, causing major destruction and wreaking havoc on hundreds of thousands of lives. It covered a total area of around 30,000 sq. km. Five districts of Azad Jammu and Kashmir (Muzaffarabad, Bagh, Poonch, Rawalakot and Neelum) and five districts of NWFP (Mansehra, Battagram, Kohistan, Abbotabad and Shangla) were the most badly affected with damage on a massive scale. But the impact was felt as far away as Islamabad and the northern parts of Punjab. The 11 story Margalla Towers Apartment Complex in the capital city of Islamabad collapsed, killing dozens of residents.

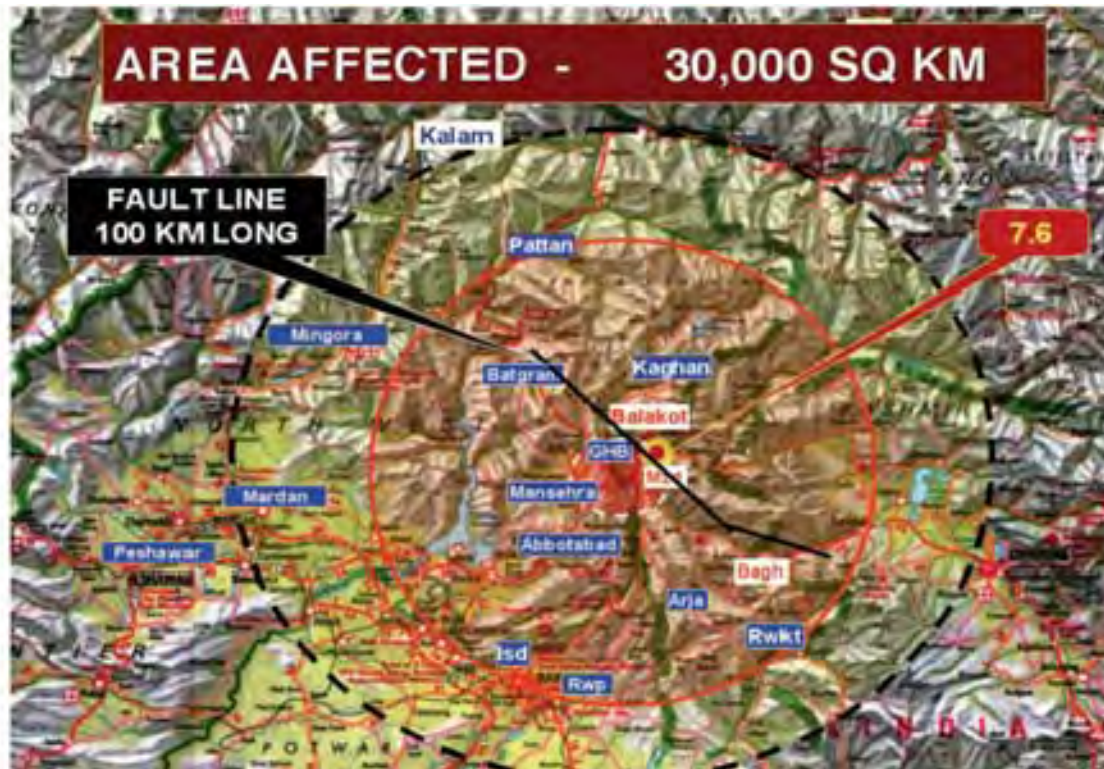


Figure 31. Epicenter and Areas Affected by the 2005 Earthquake

More than 73,000 people lost their lives and another 128,309 people were injured. Table 7 provides a listing of the number of deaths and injuries incurred. Almost 600,000 homes were destroyed, which rendered 3.5 million people homeless; 6,000 schools and colleges were destroyed and 35,000 children were killed who were attending classes at that time, and over 73% of the total 574 health facilities were destroyed. There was also extensive destruction and damage caused to other infrastructures such as roads, water pipes (one third of the primary roads in AJK and NWFP, now KPK, were affected), sanitation facilities, power supplies, telecommunications and other amenities. Table 8 provides the totals of such losses. Dozens of landslides blocked rivers and springs, destroyed woodland and caused environmental damage as well. Civil administration in the quake hit areas was seriously eroded as government buildings were destroyed, killing thousands of government personnel. Army barracks and regiments present in NWFP

(now KPK) and Azad Kashmir (AJ&K) were also decimated.¹¹⁹ The earthquake also did some damage in Afghanistan and northern India and killed number of people, injured many and caused other damages as well, but the effects were insignificant in comparison to Pakistan. There have been many secondary earthquakes in the region, mainly to the northwest of the original epicenter. On the first day after the initial massive quake 147 aftershocks were registered, one of that had a magnitude of 6.2 (a tremor of magnitude six is rated as a "strong" earthquake). Twenty eight aftershocks occurred with a magnitude greater than five during four days after the principal quake, and even eleven days after the big one there were still considerable shocks.¹²⁰

Area	Dead	Injured
Muzaffarabad	34,173	56,526
Mansehra	24,511	35,306
Bagh	8,157	24,000
Battagram	3,232	3,279
Rawalakot	1,078	2,021
Kohistan	661	2,000
Abbotabad	515	2,500
Army (AJK)	456	766
Shangla	423	957
Islamabad	74	101
Others	58	853
TOTAL	73,338	128,309

Table 7. Earthquake Damage: Human Toll¹²¹

¹¹⁹ Dr. Iffat Idrees, "Earthquake – 8/10, Learning from Pakistan's experience," October 2007. Accessed 29 March 2011. Available <http://www.ndma.gov.pk/Publications/EQBook.pdf>.

¹²⁰ Haider, "Living with Disasters, Disaster profiling of districts of Pakistan."

¹²¹ Idrees, "Earthquake – 8/10, Learning from Pakistan's experience."

Housing Units				
No. Destroyed	Pre-Quake Total	% of Total Destroyed	Population Affected (mn)	
600,152	787,583	76.2%	3.5	
Schools and Colleges				
	Destroyed/Damaged	Pre-Quake Total	% Destroyed/Damaged	
AJK	3,685	3,879	95%	
PKP/NWFP	3,984	7,577	53%	
Total	7,669	11,456	66.94%	
Health Care Facilities				
Destroyed/Damaged		Pre-Quake Total	% Destroyed/Damaged	
574		782	73.4%	
Roads: Length Affected/Total Length (km)				
	Damaged	Pre-Quake Total	% Total	
AJK	2,366	5,305	45%	
PKP/NWFP	2,063	6,658	%31	
Total	4,429	11,963	37.02%	
Telecommunications				
	Exchanges		Lines	
	Installed	Disrupted	Installed	Disrupted
AJK (SCO)	132	48	134,841	114,404
PKP/NWFP (PTCL)	119	38	20,294	12,902
Total	251	86	249,245	34,196

Table 8. Earthquake Damage: Physical Toll¹²²

F. NATURE OF RESPONSE TO THE EARTHQUAKE

1. Government Response

When the earthquake occurred in Pakistan in 2005, the country did not have a central disaster management body, so the first step taken was the establishment of Federal Relief Commission (FRC) to manage and coordinate the entire relief effort. It was comprised of two wings, civilian and a military, each headed by a chief coordinator. The role of the civilian wing was to ensure effective coordination and inter agency

¹²² Idrees, "Earthquake – 8/10, Learning from Pakistan's experience."

cooperation. The military wing was primarily responsible for all rescue and relief operations and was comprised of a Relief Planning Cell, Relief Operations Cell, Information Management Cell, Air Liaison Cell, and Foreign Collaboration Cell. Provincial Relief Commissioners were also appointed to ensure proper implementation of the FRC's policies, coordinate relief efforts with the federal government, and identify and highlight priority areas or issues for aid agencies to be addressed.¹²³

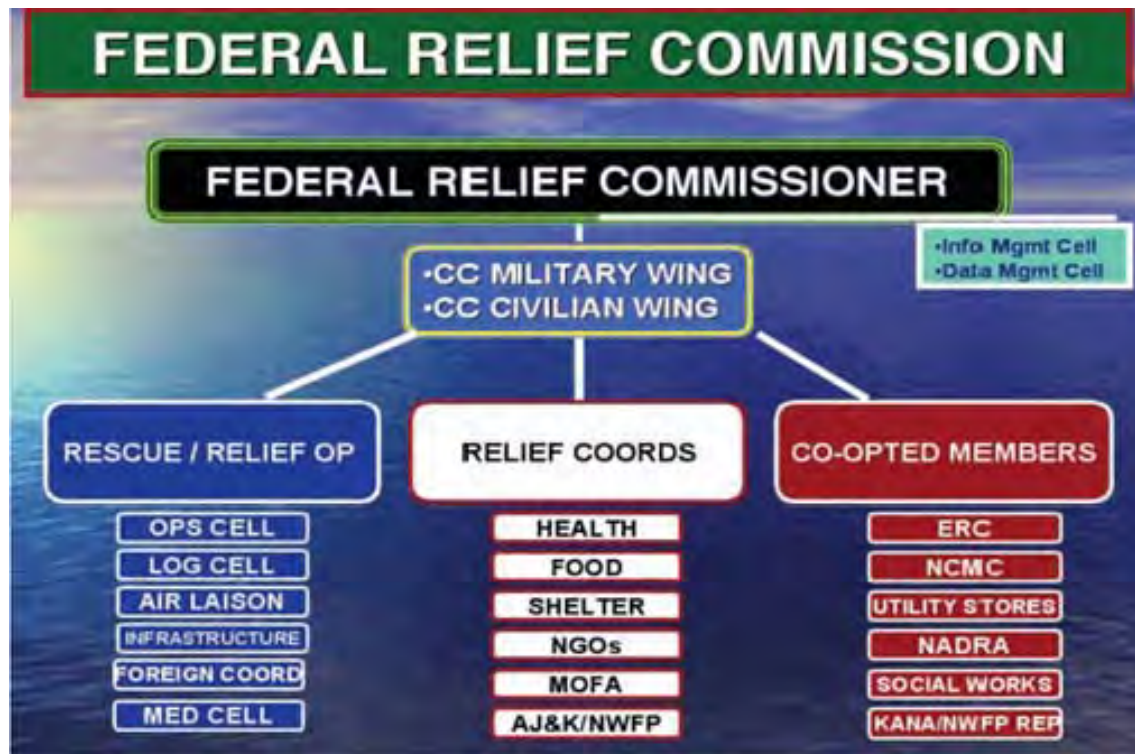


Figure 32. Organizational Structure of the Federal Relief Commission

The FRC's main focus was primarily on rescue and relief. Their main priorities were the rescue of trapped survivors; medical treatment of the injured; provision of food and water to survivors; provision of emergency shelter, clothing and bedding; restoration of communications and access to remote areas; damage control and maintenance of law and order; and support to local capacities and efforts. The Earthquake Relief and Rehabilitation Authority (ERRA) was established later on for overseeing further relief operations and rehabilitation of the affected people and affected areas and FRC was

¹²³ Idrees, "Earthquake – 8/10, Learning from Pakistan's experience."

merged into it. The Armed Forces of Pakistan, various Ministries, Utility Stores Corporation (USC), PTCL, SCO, WAPDA, NLC and the Cabinet Division's Emergency Relief Cell were critically involved in the relief operations. The Pakistan Army, being more organized and equipped, was in the forefront of search, rescue and evacuation operations and the provision of emergency relief supplies. PAF coordinated all air operations and dedicated all air assets for transportation of goods to affected areas. The Ministry of Foreign Affairs (MoFA) coordinated with foreign governments for funding and diplomatic teams to visit the region. The Emergency Relief Cell had the very important task of purchasing relief goods.¹²⁴

The Utility Stores Corporation (USC) of Pakistan opened thirty three containerized outlets in the affected areas and distributed over 15,000 tons of rations. Its contribution included a supply of 73,610 bags of composite rations between October 9 and November 14, 2005, provision and transport of seven days' reserve stocks for 1.5 million people (10,354 tons), distribution of 1,500 tons of rations to people short of food, and provision of CGI sheets to people in the affected areas at subsidized rates.¹²⁵

Military aircraft began dropping supplies into the quake zone just after the earthquake, and that was the largest air operation in the history of relief operations. Army Engineers, Special Communications Organization (SCO) and Signal Corps resources were mobilized to restore communications in the affected areas and reopen the main supply routes. Due to their concerted efforts, the three main arteries for road traffic to the affected areas were opened for light traffic within 24 – 36 hours and for heavy traffic within 72 hours. Thereafter simultaneous movements of goods by land also began, in which over 50,000 troops participated.¹²⁶

Helicopters and C-130s were extensively used for transportation of relief goods to the affected areas. Total of 129 helicopters (73 provided by international community and 56 domestic) conducted about 28,639 sorties, transported around 6,000 tons of relief

¹²⁴ Idrees, "Earthquake – 8/10, Learning from Pakistan's experience."

¹²⁵ Ibid.

¹²⁶ Ibid.

goods/rations to the forward areas, and evacuated around 17,150 casualties. The Air Force carried out 491 sorties to move goods from Karachi to Islamabad and dropped them into the affected areas, and evacuated more than 129,000 injured people. The Air Liaison Cell of the FRC also arranged fifty one visits by civil and military dignitaries to the affected areas to apprise them of the scale of destruction and efforts needed in the relief and rehabilitation process.¹²⁷

Item	Quantity
Tents	950,440
Blankets	6.5 million
Ration	256,400 tons
Miscellaneous Items	131,000 tons
Medicines	3,054 tons
K-2 Oil	2 million liters
Compensation Paid	Rs. 22 billion

Table 9. Relief Goods Provided by the end of March 2006

All Combined Military Hospitals (CMHs) in the vicinity were immediately put on high alert to prepare to receive casualties. CMHs and Army Hospitals in the affected areas were also destroyed, but those outside of the affected area played a major role in the treatment of earthquake survivors. The Army played a key role in the supply and management of medicines and other items, which were sent by the FRC along with other relief goods.¹²⁸

Around 153 relief camps were established, which included both planned as well as spontaneous camps, throughout the affected area; at one point some 200,000 internally displaced people were receiving assistance in those camps. A summary of total goods provided to the affected people through March 2006 is provided in Table 9.¹²⁹

¹²⁷ Idrees, "Earthquake – 8/10, Learning from Pakistan's experience."

¹²⁸ Ibid.

¹²⁹ Ibid.

2. Response from the Pakistani Public

The public response to the earthquake was unprecedented and people from all walks of life came forward to help their country mates through monetary donations, supplies of relief goods, and a great number volunteered their services to help the quake survivors. Tens of thousands of quilts, items of clothing, stoves, heaters, food rations and other goods were donated from all over the country. Within hours and days many national and international teams of medical experts and other volunteers started arriving in the quake affected areas, bringing with them a range of medical and non medical supplies. They brought about a huge increase in local capacity to deal with the large numbers of casualties. All fields of media, such as TV, the press, celebrities, and the fashion industry, carried programs and special events to raise awareness of the plight of the quake survivors and raise donations and other resources for them. About 23% of total food rations and 2.2 million quilts (36% of the total) were donated by the government and people of the Punjab province. People of the province of Sindh were equally helpful, with huge quantities of relief supplies collected at Karachi and other cities. These were sent to the FRC by air, rail and road for distribution to the affected people.¹³⁰

The Pakistani diaspora in the UK, U.S. and other countries also participated in the relief operation very actively and generously. They donated tons of relief goods and many even travelled to Pakistan for participation in the relief efforts.¹³¹

3. Response from the International Community

The international community also responded generously and a total of sixty eight countries sent supplies to help the earthquake affected people. The significant contributions were:¹³²

¹³⁰ Idrees, "Earthquake – 8/10, Learning from Pakistan's experience."

¹³¹ Ibid.

¹³² Ibid.

- Turkey donated 55,000 tons of rations, over 1 million blankets, 9,000 tents, nine field hospitals, 114 tons of medicines, two tent villages catering around 5,000 people and also large cash donations.
- Sri Lanka donated 3,000 tons of rations.
- China provided 210,880 blankets, 14,000 tents, sixty four tons of medicines, and sent a 50 member rescue team with sniffer dogs to rescue survivors.
- Saudi Arabia provided hundreds of thousands of blankets, quilts, stoves, food packages, tons of dates, medicines, thousands of winterized waterproof tents, thousands of polypropylene sheets and more than \$500 million to help revive the normal life of earthquake victims.
- Japan sent 120 rescue workers, set up a field hospital and provided heavy machinery to clear rubble (ten excavators and ten bulldozer cranes).
- The U.S. provided 189,827 blankets, set up two MASH hospitals and provided 159 tons of medicines. The U.S. Army provided an engineering detachment (SEABEES) comprising 116 people. They brought with them fifteen plant pieces and a number of generator sets. The company commenced work in the first week of November, and was replaced by forty personnel in December 2005. On departure, the company handed over twenty five plant pieces to Pakistani engineers to use in rescue and relief operations. The U.S. Army also provided twenty four helicopters.
- Germany sent a search and rescue team.
- Cuba made a particularly big contribution to health care for the survivors, sending 2,575 medical personnel who set up thirty field hospitals and formed fifteen medical teams. A total of 1.3 million out patients attended the facilities, 7,768 were admitted, 12,406 operations were performed, and 100,000 patients were given physiotherapy.
- Iran provided two helicopters to support the relief effort and twenty two vehicles (fifteen ambulances, four buses, two vans, one jeep). It also set up two 50 bed field hospitals and gave four tons of medicines.

- The ICRC carried out its own needs assessment and launched its independent, self contained relief operation. It chartered eight helicopters, which flew 8,000 sorties and distributed 12,791 tons of food and 1,275 tons of non food items.
- NATO provided NATO Response Force-5 (NRF-5), which was comprised of NATO field hospitals (manned by the Dutch), NATO engineers (Italian), and Spanish, Polish, British and Lithuanian engineer assets. The NATO field hospitals treated 7,490 patients and a further 9,724 via mobile medical teams, and carried out 2,300 immunizations. NATO engineers removed 41,500 m³ of debris at twelve major sites, carried out repairs on 59 km of roads at three locations, constructed twenty retaining walls, built 110 high altitude structures, and deployed eight water purification plants. NRF-5 also set up thirteen tent schools. NATO also provided six helicopters and they carried 1,740 tons of relief goods to the affected areas as well as evacuated 7,750 displaced/sick/injured people.¹³³

4. UN Response

Pakistan requested UN support on the afternoon of October 8, 2005, and members of UNDAC arrived the following morning. The UNDAC team's initial tasks were critical. With support from Pakistani officials and the UN Country Office, it was possible to immediately set up an onsite coordination centre in Muzaffarabad, as well as an international reception centre at Islamabad Airport and a functioning coordination hub in Islamabad. Within the first two weeks it was able to establish Humanitarian Hubs in Bagh, Batagram, Mansehra, as well as Muzaffarabad. Cluster leads were appointed and the lead agencies appointed individuals to lead the process of gathering data, projections and project proposals and submitting cost proposals for consolidation in the Flash Appeal, which was subsequently launched for \$266 million.¹³⁴

¹³³ Idrees, "Earthquake – 8/10, Learning from Pakistan's experience."

¹³⁴ Ibid.

A cluster approach was applied for the entire earthquake disaster response. The idea was discussed with the FRC, who approved the cluster approach and nominated focal persons for each cluster within the FRC. The clusters were: emergency shelter, protection, water and sanitation, education, IT/communications, logistics, nutrition, health, camp management, and early recovery and reconstruction. UNDP was cluster lead for early recovery, WFP for nutrition, IOM for emergency shelter, and so on.¹³⁵

One week following the UN Flash Appeal hardly any funds had come in. The UNHCR had expended almost all its emergency funds, as had UNICEF, WHO, other major organizations in the UN System, as well as the key international organizations. An ‘80:20 strategy’ was then adapted in which the Pakistan military would deliver roughly 80% of relief goods and humanitarian agencies 20%, and parallel efforts were also made to mobilize funds. In conjunction with the UN’s Emergency Relief Coordinator, the Resident Coordinator initiated an aggressive media strategy to raise awareness of the funding situation. A revised Flash Appeal was issued, based on new information and assessments, which raised the estimated cost of the relief operation to US\$560 million. Thanks to these efforts, money did begin to come in just in time. In November 2005, the International Donors’ Conference was held in Islamabad and pledges of around \$5.87 billion were made for funding various reconstruction activities and also funds were provided by the government and different NGOs.¹³⁶

The UN had a health cluster for that the lead was assigned to the World Health Organization (WHO). This cluster coordinated medical evacuation services, international medical teams, supply of medicines, establishment of mobile clinics and field hospitals, and other assistance provided by donor agencies and the international community. The health cluster also worked closely with government agencies to ensure that all assistance supplemented Pakistani initiatives and the overall strategy laid down for health care. Immunization against infectious diseases including cholera, typhoid, measles and tetanus was carried out by Expanded Program of Immunization (EPI) teams of the MoH, WHO, UNICEF, Aga Khan Foundation and AMC units. The goal was to achieve 90 – 100%

¹³⁵ Idrees, “Earthquake – 8/10, Learning from Pakistan’s experience.”

¹³⁶ Ibid.

vaccination of the populations in the tent villages. Tetanus was a particular concern because of the number of injuries, and urgent arrangements were made for vaccines, as these were initially in short supply. In addition, MSF (France) established a 20 bed hospital at Mansehra for tetanus patients. AMC and MoH teams also sprayed insecticide in affected areas to control the spread of disease. UN organizations also provided seventeen helicopters.¹³⁷ The UN response was swift, focused and determined and that helped the government of Pakistan in relief operations and is still helping it in the rehabilitation process as a number of projects are currently ongoing.

5. Response from International and Local NGOs

Prior to the 2005 earthquake, some thirty four international NGOs (INGOs) were operating in Pakistan. After the earthquake many more came into the country and INGOs were joined by many domestic NGOs. A total of 140 NGOs were formally registered with the FRC, but there were hundreds more small scale and/or local level NGOs who participated in the relief effort. These NGOs provided rations, medicines, blankets and clothing, tents, stoves, and much more to the affected people. Donor agencies and NGOs were in fact the main providers of CGI sheets for the construction of semi permanent shelters, in fact 175,000 shelters out of the total of 370,000 shelters were constructed using CGI sheets donated by these NGOs and donors, which helped people to survive the harsh winters and averted the need for a mass migration out of the affected areas. Support in terms of services included volunteers to help in rubble clearance and rescue work, distribution of goods, construction of shelters, and medical personnel to provide treatment to the survivors¹³⁸.

G. MODERN TOOLS USED DURING THE 2010 FLOODS

The Pakistan floods in 2010, despite their gravity, did not mobilize volunteer technical communities to the same extent Haiti had done six months prior. Many of the modern tools that were used successfully in Haiti were also used in Pakistan flood relief

¹³⁷ Idrees, "Earthquake – 8/10, Learning from Pakistan's experience."

¹³⁸ Ibid.

operations, but their application was limited and did not prove that successful. This failure was contributed to Pakistan's technological infrastructure because the level of mobile phone adoption in the flooded areas was very poor, and the non availability of satellite imagery of the country made it so the volunteer developers struggled in plotting where relief was a priority.¹³⁹ Following are some of the modern tools used by local and international relief organizations during the flood relief operation.

1. FloodMAPS

It is local website tool created by Mr. Sohaib Khan, a computer science professor at Lahore University of Management Sciences (LUMS), and sponsored by the provincial government of Punjab, SUPARCO and International Growth Centre (IGC). It relied on Google Earth and Google Maps to track the path of the flood and monitor devastation like washed out bridges that needed to be rebuilt, etc. These maps provided detailed views of thousands of villages affected by the downpour, broken down by region. The primary users of these maps were NGOs at work in Pakistan and also the Punjab government. The maps themselves track data provided by affiliated aid groups about damaged roads and other affected infrastructure.¹⁴⁰ The FloodMAPS team was engaged in working with the Imran Khan Foundation (IKF), catering to their mapping needs. The IKF launched two initiatives simultaneously throughout the affected areas: the seeds distribution campaign (distribution of wheat seeds across the country) and a village development project (the construction of model villages in different flood affected areas). Both of these projects were mapped and the progress of both campaigns can now be viewed online.¹⁴¹

¹³⁹ Shane, "Pulling together in a crisis."

¹⁴⁰ Spencer Ackerman, "Pakistan Aid Groups Route Around U.S. Military for Relief Web," 8 September 2010. Accessed 7 April 2011. Available <http://www.wired.com/dangerroom/2010/09/pakistan-aid-groups-arent-friending-the-u-s-military-online/>.

¹⁴¹ Pakistan FloodMAPS, "Flood Monitoring and Policy Support," No Author. Accessed 7 April 2011. Available <http://floodmaps.lums.edu.pk/>.

2. CrisisCommons

CrisisCommons had a detailed Pakistan flood wiki going and it put together a 20 hour CrisisCamp day on September 3 – 4, 2010 with problem definitions for exploration of solutions and recommendations related to the Pakistan floods. Anyone could provide written recommendations and ideas. Video submissions were also welcomed from groups or individuals. CrisisCommons seeks to advance and support the use of open data and volunteer technology communities to catalyze innovation in crisis management and global development.¹⁴²

3. HARMONIEweb

It was an unclassified portal site for U.S. government and non government civilian aid workers and the military to exchange flood information. The links to most of the organizations involved in flood relief are given and anyone interested in helping out can request a HARMONIEweb account. Users can post their documents, announcements, calendar events, requests for assistance, and any other information they want to share. But HARMONIEweb didn't seem to have worked very well during the disaster and failed in building up a sizable community.¹⁴³

4. Google Crises Response

Google's tool, Google Person Finder, which is used to connect those seeking information about loved ones, and Google Resource Finder, which helps locate medical facilities and other emergency services during a crisis, were used to some extent during flood relief operations. Google joined the Pakistan flood relief campaign and opened donation links for different UN and other charity organizations.¹⁴⁴

¹⁴² CrisisCommons, "Pakistan/2010 Floods," No Author. Accessed 8 April 2011. Available http://wiki.crisiscommons.org/wiki/Pakistan/2010_Floods.

¹⁴³ Pakistan Humanitarian Assistance and Disaster Relief, No Author. Accessed 8 April 2011. Available <https://hadr.harmonieweb.org/Pages/Default.aspx>.

¹⁴⁴ Google.com, "Google Crises Response: Support Disaster Relief in Pakistan," No Author. Accessed 29 March 2011. Available at http://www.google.com/crisisresponse/pakistan_floods.html.

5. PakRelief Crowd Map, Pak Flood Incident Reporting System

People with access to working mobile phones were asked to text a message to 3441 and relay their first hand information about the nature of emergencies and the needs of people in a particular flood affected location. This information was then verified and mapped onto the CrisesMap. PakRelief would then notify a relief agency working nearby of that particular incident and the type of help required. The group is comprised of local and international collaborators with significant experience in global disaster coordination.¹⁴⁵

6. PakReport

PakReport is a donor supported SMS effort established by Pakistani technologists and their mostly American academic friends. PakReport allowed people affected by the flood to send in their location and a message about their needs. Using the Ushahidi mapping tool, flood stricken Pakistanis could then find their emergency information tracked by type and location, giving officials and independent aid agencies a view into the evolving landscape of people's needs. A text message to number 3441 was used to help create a distributed database of crisis information.¹⁴⁶

7. Humari Awaz

This is a mobile phone based social networking channel, which was established with the help of the U.S. State Department. It is available to all cell phone operators in Pakistan. Through this network, one can create their own group and anyone can join it for free. The group founder can then send one SMS, which will automatically be sent to all the group followers. The purpose of establishing Humari Awaz was to build mobile based networks around shared interests, themes and subjects and to create social networks that facilitate more people to people interactions. A text SMS "HELP" or "MADAD" sent to

¹⁴⁵ Pakistan Flood Incident Reporting, No Author. Accessed 7 April 2011. Available <http://pakrelief.crowdmap.com/page/index/1>.

¹⁴⁶ Pakistan Flood Incident Reporting, "What You See About Floods, SMS to 3441," No Author. Accessed 9 April 2011. Available <http://www.pakreport.org/ushahidi/page/index/1>.

7111 helps the users to go through the registration process. During the flood relief operations, people were invited to use this tool to share information; update each other about the latest flood news, valuable NGO grants, and business opportunities; and to make new announcements of support by SMS texting the word FLOODS to 7111.¹⁴⁷ During the flood disaster this social networking tool didn't seem to work very effectively, as most of the people in the affected area were unaware of any such network.

8. Donor2Deed (D2D)

Donor2Deed (D2D) is an integrated online fundraising and communications tool that uses geolocation services like Google Earth and Google Maps to connect donors directly to projects. It then automatically updates the donor on the progress of the project in a format (SMS, e-mail, etc.) and in a timeframe that the donor chooses. Donor2Deed has a Facebook and iPhone application and can also link to a Twitter account. Donor2Deed worked during the floods to map the Pakistan relief effort and provided this service free to charities to help them raise more money for the victims of the floods.¹⁴⁸

9. Social Networking Sites like Facebook and Twitter

These sites helped the Pakistani community to be connected and to raise the voice for the help of flood victims throughout the world. They were able, to some extent, to mobilize people in different parts of the world to help the flood victims. Using Twitter also got different celebrities throughout the world to tweet their fans to help flood victims at Pakistan.

¹⁴⁷ America.gov, "U.S. Response to Pakistan's Flood Disaster," No Author, 14 October 2010. Accessed 7 April 2011. Available at <http://www.america.gov/st/texttrans-english/2010/October/20101015105835su0.4777905.html>.

¹⁴⁸ Jorgen Sunberg, "Donor2Deeds Aids Pakistan Flood Victims Using Geolocation Tools," Accessed 7 April 2011. Available <http://jorgensundberg.net/content/donor2deed-aids-pakistan-flood-victims-using-geolocation-tools>.

10. Sahana

Sahana was one of the information management tools providing resources on the Pakistan flood response. It could provide the raw data, in various formats including on maps, and is built on an open source rapid application development framework and supported by a global community of volunteers. Therefore, new features can quickly be developed in response to changing requirements on the ground.¹⁴⁹

11. ReliefWeb

This web site provided updates on the relief works, funding status, information on links to all agencies involved in the relief and recovery operations, UN appeals, situation reports and latest updates of disaster related events taking place around the globe.¹⁵⁰

12. LIVPOD

The UNIGEO initiative for Pakistan provided extranet access to LIVPOD, a cloud computing service designed for sharing live notes on the ground, between the Emergency Relief teams and their different partners, using mobile devices such as smart phones/pads/laptops, etc. It provides them an easy way to upload their breaking news onto a common data server and, in return, get specific details and/or global views on the situation in terms of immediate needs, food availability, refugee camps management, logistics, etc. Small web maps for mobile use are automatically created through Google Maps or other API.¹⁵¹

¹⁴⁹ Pakistan Sahana, "Sahana Pakistan Floods Response," No Author. Accessed 7 February 2011. Available at <http://pakistan.sahanafoundation.org/eden/>.

¹⁵⁰ ReliefWeb, No Author. Accessed 26 March 2011. Available <http://www.reliefweb.int/rw/dbc.nsf/doc100?OpenForm>.

¹⁵¹ The UNIGEO Initiative for Pakistan, "Pakistan Floods Dashboard," No Author. Accessed 7 April 2011. Available <http://unigeo.web4me.fr/index.php?&bk=&wi=1440>.

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IV. METHODOLOGY

A. EXPLANATION OF SELECTED VARIABLES

The following potential variables were selected for comparative analysis of response by the international community in the HA/DR operations in the two chosen exemplar cases. Each variable was assigned a weighting score 'N' according to its influence and significance on the response by the international community in HA/DR operations. The effects of each variable on the response shown by the international community in the two exemplar cases (i.e., earthquake in Haiti and floods in Pakistan in 2010) were explored. The country, which had better response by the international community under influence of a particular variable was assigned the value 'N+N/2' and the other 'N-N/2.' The values assigned to each variable for both countries were then used to determine the cumulative response by the international community in each country. That led to the determination of whether the international community response in both the exemplar cases was equitable or not; and if not, what the reasons were for that difference and what should be done to improve it and make it equitable.

1. Pre-existing Conditions in the Country

The following pre-existing conditions were explored to determine the state of the each country before the disaster.

a. Overall Political and Economic Conditions

Haiti has been suffering from political unrest, human rights violations and disturbance for a very long time, and a UN peace keeping and stabilization force has been present in the country since 2004. It had been ruled by different dictators; however, the country was headed by a political leader at the time of disaster, but still the state of the government and the country was not very good. Haiti has been suffering from racial injustice and discrimination as the white minority has been holding most of the country's wealth and had been suppressing the black Creole majority, which resulted in the

deteriorated law and order situation and increased crime rate. Haiti's economy was struggling. It depended heavily on agriculture, more than two thirds of Haiti's work force is engaged in agriculture, and around three quarters of the total population depends on this sector.

Pakistan had also been facing political disturbances throughout its history. Democracy had been struggling in the country and political governments had been toppled four times, and the military had been ruling the country for more than thirty years out of its total existence of about sixty four years. This led to the situation where institutions had been struggling and corruption had infiltrated almost every institution/organization. It was under military rule during the 2005 earthquake and was under political rule during the 2010 floods. The military is out of the government; however, it is perceived that the military has a strong role in the government's major decision and policies. The war in Afghanistan and the drone attacks by the U.S. in the border areas of Pakistan have been a source of instability in the country. Pakistan has also been facing border issues with a larger neighbor, India, and has fought a number of wars in the past and the border still remains active almost throughout the year. Pakistan depends heavily on the agriculture sector and around 20% of its exports come from cotton only, and it also exports different commodities like rice and fruits, etc. After the floods, this sector was badly damaged and suffered great losses. Pakistan has a good leather industry and exports a number of leather goods to different countries. Due to the floods, it lost a lot of livestock and this sector was also very badly affected.

This variable explores the state of overall stability of both the countries at the time of disaster and how it affected the response by the international community to help each country in relief and rehabilitation efforts. The state of the economy of both countries at the time of the disaster is also explored in the context of impact on the relief and rehabilitation efforts by the government and any impact on the response from the international community.

b. State of Military Forces or Trained Human Resources Available for Rescue and Relief Work

This variable explores the risk reduction and mitigation of human resources available to each country at the time of the disaster. The armed forces' strength and capabilities, because they are well organized and often well equipped, is to be considered an important element for the government in case of any disaster. This is especially true for those disasters, which are sudden in nature and require immediate and large scale response, like earthquakes, and also, which are greater in scale and require a large number of properly trained, organized, well coordinated and well resourced assets to respond, like floods. The state of the armed forces and what other forces were available in both countries at the time of disaster is examined.

c. Geographic Location and Level of Engagement with the International Community

Pakistan is located very close to the mouth of the Persian Gulf from where most of the oil is shipped to the world, and is also connected to resource rich Central Asian States linking them to the sea. It shares borders with China and India, which are both emerging economic, as well as military, powers in the region. It also shares borders with Afghanistan, where U.S. and NATO forces are engaged in a war against the Taliban, and Pakistan is their key non NATO ally and provides the main supply route for logistics, and Iran, which is also very oil rich and under the focus of the world, especially due to its nuclear issues. This location signifies the importance of Pakistan in international politics but poses a number of challenges as well. Haiti had the advantage of being close to the U.S., and the fact that most of the UN agencies have their headquarters in the U.S. had an impact on response shown during the earthquake in 2010. Most of the information communication technologists were from the U.S. and could quickly and easily reach Haiti. This variable will determine how much affect the geographic location and engagement level with the international community by both the countries had on the international community's response.

2. Media Attention

When Haiti was hit by the earthquake, the media throughout the world made it a top story, telling and showing the scale of damages and casualties suffered in the country. This ultimately created sympathy and mobilized a lot of volunteer individuals and organizations to rush to Haiti for help in rescue and relief efforts, in addition to the help coming to the country from other governments. This media projection also motivated the general public throughout the world, especially U.S. citizens, to make huge donations in terms of cash and goods, which helped a great deal in the rescue and recovery efforts. In the case of Pakistan, coverage was initially very minimal with the international media; it did not project floods as a large scale disaster due to lack of forecasting the scale of destruction and damage, which was to follow. By the time the severity of the scale of the disaster was realized and media started to highlight it, most of the general public did not take serious note of it and did not pay much attention to the calls for donations and help. This resulted in slower and less generous response from the public in terms of cash and goods donations. Another contributory reason may be that part of media highlighted the issues of corruption in the government ranks and also created doubts that the donations given may go in the hands of extremist militants fighting against the U.S. and NATO forces in Afghanistan. These types of media reports affected the motivation of general public to come forward to help Pakistan in terms of donations or volunteering to go there to help in rescue and relief operations. This variable explores the effects of the media campaign on the international community response in the two exemplar cases.

3. Nature of the Disaster

Earthquakes occur at a particular time and cause a lot of infrastructure damage and casualties in a very short time, which sparks alarm all over the world and makes for very big news for people all around the world. This nature of the sudden disaster and large number of casualties makes people respond quickly to help in rescue and relief operations with a lot of resources. This factor also motivates sympathetic people to donate to the victims and to volunteer to participate in relief and recovery efforts as the destruction and damage is much more visible. In the case of floods, normally it builds

over a longer period time and generally causes less loss of life and therefore does not raise a loud alarm among the people and does not make for a very big story. Therefore, people generally do not respond aggressively for relief and recovery calls for floods. Due to a lower casualty rate, people feel less sympathetic and therefore donate less. This variable explores how it affected the response by the international community in the two exemplar cases.

4. Temporal Factors

Fortunately, the world did not suffer any disaster of the scale of Haiti earthquake or Pakistan floods in year 2009, or January 2010 before the Haiti earthquake. Therefore, the NGOs and other volunteer organizations had their funds available to aggressively participate in rescue and relief efforts in Haiti. There was no major fundraising campaign run for the victims of a major disaster in the U.S. prior to the Haiti earthquake; and the people started to receive their tax return money, and therefore those people having motivation for charity had extra money for donations and they did so generously. A lot of funding was generated through donations by the governments and public around the world, especially from U.S. citizens in very quick response time. A lot of volunteers and NGOs reached Haiti in no time and took over all the relief and rehabilitation work in coordination with U.S. Southern Command and other forces. Pakistan floods occurred around seven months after the earthquake in Haiti, and by that time most of volunteers and NGOs had already exhausted their resources in Haiti and therefore were required to generate and collect fresh funding for their operations in Pakistan. Therefore, the sequence of occurrence of these events had a great impact on the response of international organizations, especially volunteers and NGOs. This variable explores how significant this factor was for the international community for their response in the two exemplar cases.

B. WEIGHTING ASSIGNED TO EACH VARIABLE

The weighting assigned to each variable is shown in Table 10.

Variable	Weighting (1:Least Significant – 10: Most Significant)
Pre-existing conditions in the country: <ul style="list-style-type: none">• Overall Political and Economic Condition• Armed Forces/Trained Human Resource Available for Rescue and Relief efforts• Geographical Location and Level of Engagement with International Community	8 6 7
Media Attention	8
Nature of the Disaster	10
Temporal Factors	8

Table 10. Table of Weighting for Each Variable

V. STATE OF VARIABLES

In Chapter IV, variables were defined and explained and assigned weighting scores based on the perceived impact and influence these have on triggering a response by the international community to a major natural disaster. In this chapter, the state of each variable for both countries is examined, how the international community responded, and how that particular variable affected the response. Based on that, the value of the variable for each country was determined. The value assigned indicates for each variable how it affected a response from the international community for each country. Taking into account values determined for all the variables, conclusions were drawn regarding the nature of the response from the international community and conditions to improve it.

A. STATE OF EACH VARIABLE

Each variable below explores the state of each country regarding that particular variable and how it affected the response of the international community. The final value for each variable takes into account the affect that variable had in mobilizing response from the international community.

1. Pre-existing Conditions in the Country

The following pre-existing conditions were examined to determine the state of the country before the disaster.

a. Overall Political and Economic Conditions

Pakistan has been struggling for stability since its birth in 1947. The internal potential problems had been mainly contributed to a number of military coups, corrupt and inefficient political leaders, natural disasters, internal conflicts, the deteriorating law and order situation, suicide bombings and large scale violence in different regions of Pakistan. Pakistan's support to the United States after September 11th against the Taliban in Afghanistan brought it face to face with radical extremist elements

within the country and from the western borders. These extremists, joined by other criminals, have been conducting acts of terrorism throughout the country causing further instability within its borders.¹⁵² The two provinces, Baluchistan and Khyber Pakhtunkhwa, including the tribal areas, are in the grip of insurgency, militancy, violence and terrorism. Two other provinces, Sindh and Punjab, have also been victims of terror attacks and a breakdown of the rule of law. The most prominent external reasons are a continuous tension along the borders with India almost throughout the history, the instability of Afghanistan due to ongoing war against Taliban, and the freedom movement going on in Kashmir.

The U.S. State Department's Global Peace Index placed Pakistan as the world's fifth most unstable country after Iraq, Somalia, Afghanistan and Sudan.¹⁵³ Pakistan's ranking, according to the Global Peace Index (GPI), is 145 on a list of 149 countries. Transparency International and the International Crisis Group have also expressed their concern over the state and progress of state institutions in the country because in the last four decades Pakistan's performance has degraded in terms of development, education, rule of law, and work ethics.¹⁵⁴

¹⁵² M. Lucivero, "Stability in Pakistan: Musharraf and Elections in South Asia." Accessed 18 April 2011. Available http://www.fpa.org/topics_info2414/topics_info_show.htm?doc_id=120198.

¹⁵³ Vision for Humanity, "Global Peace Index GPI Map-2010: Score," No Author. Accessed 19 April 2011. Available <http://www.visionofhumanity.org/gpi-data/#/2010/scor/>.

¹⁵⁴ Dr. Moonis Ahmar, "Pakistan as the fifth most unstable country," DAWN.COM. 13 June 2010. Accessed 19 April 2011. Available <http://archives.dawn.com/archives/59855>.

Indicator	Weight (1 to5)	Pakistan (Score out of 5)	Haiti (Score out of 5)
Internal Peace	60%	Lower score indicates better performance	
External Peace	40%		
Perceptions of criminality in society	4	3	4
Number of internal security officers and police per 100,000 people	3	2	2
Level of organized Conflicts (internal)	5	4	3
Level of violent crime	4	3.5	4
Political instability	4	4	3.75
Level of disrespect for human rights (Political Terror Scale)	4	4	2.5
Potential for terrorist acts	5	4.5	2
Number of deaths from organized Conflicts (internal)	5	5	1
Number of armed services personnel per 100,000 people	2	1	1
Military capability/sophistication	2	4	1
Relations with neighboring countries	5	4	2
Funding for UN Peacekeeping Missions	5	1	1.5
Number of external and internal Conflicts fought: 2003–08	5	5	1.5
Estimated number of deaths from organized Conflicts (external)	5	2	1

Table 11. Comparison of Important GPI Indicators for Pakistan and Haiti¹⁵⁵

¹⁵⁵ Vision for Humanity, “Global Peace Index GPI MAP-2010: Haiti and Pakistan,” No Author. Accessed 19 April 2011. Available <http://www.visionofhumanity.org/gpi-data/#/2010/scor//compare/HT+PK>.

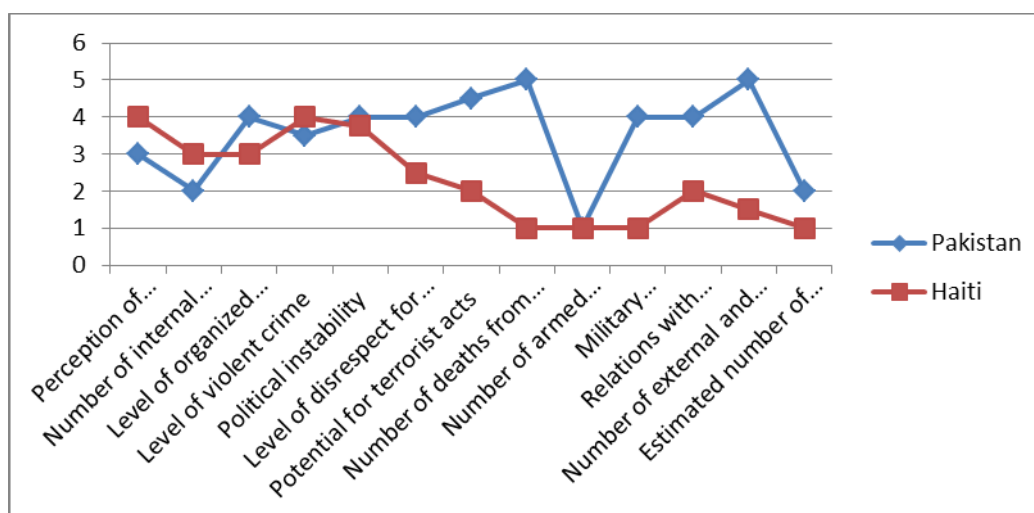


Figure 33. Comparison of GPI Indicators for Pakistan and Haiti

The continuing security crisis led one U.S. index, published in Foreign Policy magazine in June 2010, to rank Pakistan as the tenth most failed state in the world, one place above Haiti in a list headed by Somalia. A detailed comparison of both countries is shown in Table 12.¹⁵⁶

Indicator	Pakistan (Score out of 10)	Haiti (Score out of 10)
Demographics Pressures	8.1	9.3
Refugees/IDPs	8.9	5.6
Group Grievance	9.4	7.3
Human Plight	7.9	8.6
Uneven Development	8.4	8.3
Economic Decline	6.2	9.2
Delegitimization of the State	8.9	9.3
Public Services	7.3	9.5
Human Rights	8.9	8.3
Security Apparatus	9.7	8.2
Factionalized Elites	9.5	8.4
External Intervention	9.3	9.6

Table 12. Comparison of Failed States Index 2010¹⁵⁷

¹⁵⁶ "The Failed State Index 2010," No Author, Foreign Policy Magazine, 21 June 2010. Accessed 19 April 2011. Available http://www.foreignpolicy.com/articles/2010/06/21/2010_failed_states_index_interactive_map_and_ranking_s.

¹⁵⁷ Ibid.

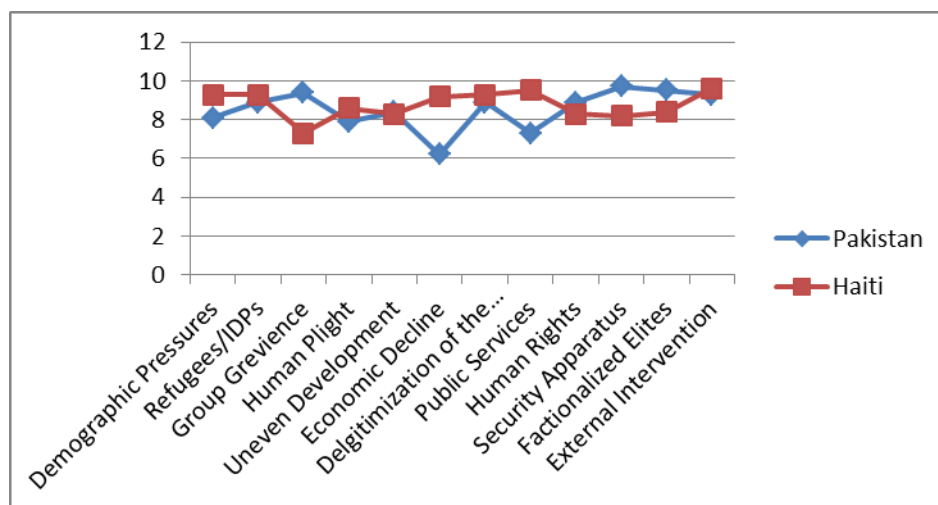


Figure 34. Comparison of Failed States Index 2010

On the economic front, Pakistan was ranked 123rd in the Global Competitive Index (GCI) out of total of 139 countries surveyed in 2010.¹⁵⁸ Its ranking was: 46th with respect to GDP (\$166.5 billion), sixth in population (180.8 million), 113th with respect to GDP per capita (US\$1,017), 23rd with respect to share in world GDP (0.63%), and 27th with respect to GDP (PPP) (US\$435.8 billion).¹⁵⁹

In FY 2009 – 2010, the estimated GDP growth rate was 2.7%, and unemployment was estimated at 15%. Consumer price inflation averaged 13.4% in 2010.¹⁶⁰ Low levels of spending in the social services and high population growth have contributed to persistent poverty and unequal income distribution. The country's economy remains vulnerable to internal and external shocks due to internal security concerns and the global financial crises. Pakistan has received significant loan/grant assistance from international financial institutions (e.g., the IMF, the World Bank, and the Asian Development Bank (ADB)) and bilateral donors, particularly after it began using its military/financial resources in counterterrorism efforts after the September 11,

¹⁵⁸ Klaus Schwab et al., "WEF: Global Competitive Report 2010-2011," p.15. Accessed 28 April 2011. Available http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2010-11.pdf

¹⁵⁹ Ibid., 360-363, 474.

¹⁶⁰ CIA, "The World Fact Book-Pakistan," No Author. Accessed 28 April 2011. Available <https://www.cia.gov/library/publications/the-world-factbook/geos/pk.html>.

2001 terrorist attacks in the United States. Pakistan remains dependent on IMF and other international assistance for budgetary support, and to keep the country more or less solvent. Pakistan's principal natural resources are arable land, water, hydroelectric potential, and natural gas reserves. About 28% of Pakistan's total land area is under cultivation and is watered by one of the largest irrigation systems in the world. Agriculture accounts for about 21% of GDP and employs about 42% of the labor force. The most important crops are cotton, wheat, rice, sugarcane, fruits, and vegetables, which together account for more than 75% of the value of total crop output. Pakistan's manufacturing sector accounts for about 25% of GDP. Cotton textile production and apparel manufacturing are Pakistan's largest industries, accounting for about 51.4% of total exports. Other major industries include food processing, beverages, construction materials, clothing, and paper products. In the 2009 – 2010 fiscal years Pakistan's trade deficit was \$10.92 billion. Energy imports account for nearly 30% of Pakistan's imports, and the total gap between electricity supply and demand in Pakistan is over 4,800 megawatts (MW). The energy crisis and security concerns have hampered Pakistan's textile reliant export base. Pakistan's exports continue to be dominated by cotton textiles and apparel, despite government diversification efforts.¹⁶¹

The floods not only necessitated a huge rescue and relief operation but also threatened to undermine Pakistan's halting recovery from the 2009 recession. In addition to the damage to an already weak infrastructure and the worsening of the energy supply situation, standing crops of rice and cotton were destroyed in Punjab and Sindh. This would unfavorably impact the textile industry, which is crucial to Pakistan's exports.

Due to fighting between the Pakistan Army and extremist militants in the northwestern region, around one million people have been displaced and floods affected around 20 million people. This made it impossible for the government to provide basic

¹⁶¹ U.S. Department of State, "Background Note: Pakistan," No Author, Bureau of South and Central Asian Affairs, 6 October 2010. Accessed 23 April 2011. Available <http://www.state.gov/r/pa/ei/bgn/3453.htm>.

shelter, basic food, medical care and rehabilitation very effectively and created a great deal of social unrest among the affected people in the affected areas.¹⁶²

However, history shows that Pakistan has, throughout its existence, displayed a resilience rooted in the energy of the population, despite the devastations of natural disasters, wars and misgovernment. Just as most of the individuals survived the flood through their own resourcefulness and toughness, the citizens and NGOs form part of an emerging civil society, which was dramatically announced to the world by the unprecedented lawyers' movement, which undermined ex-president General Musharraf and forced President Zardari to back down for his stand on the issue of restoration of Supreme Court Judges. Its emergence has shown the possibility of intellectual and political realignment in Pakistan.¹⁶³

Haiti has also struggled throughout its history for stability within the country and has suffered due to invasions, dictatorships and racial discrimination. It was ranked 114th out of 149 states in the Global Peace Index for 2010.¹⁶⁴ It was ranked 11th among the failed states for 2010.¹⁶⁵ The details are mentioned in Tables 11 and 12.

The United Nations Stabilization Mission in Haiti (MINUSTAH) was established on June 1, 2004 by Security Council resolution 1542. The UN mission succeeded a Multinational Interim Force (MIF) authorized by the Security Council in February 2004 after President Bertrand Aristide departed Haiti for exile in the aftermath of an armed conflict, which spread to several cities across the country. MINUSTAH's

¹⁶² Michael Geory, "Flood refugees threaten Pakistan's political stability," REUTERS, 22 September 2010. Accessed 18 April 2011. Available <http://in.reuters.com/article/2010/09/22/idINIndia-51662920100922>.

¹⁶³ Ian Talbot, "Pakistan after the floods: Prospects for Stability and Democratic Consolidation," Institute of South Asian Studies (ISAS) Working Paper Number 122, 10 February 2011. Accessed 18 April 2011. Available http://www.isas.nus.edu.sg/Attachments/PublisherAttachment/ISAS_Working_Paper_122_-_Email_-_Pakistan_after_the_Floods_11022011154713.pdf.

¹⁶⁴ Vision for Humanity, "Global Piece Index GPI MAP-2010: Score," No Author. Accessed 19 April 2011. Available at <http://www.visionofhumanity.org/gpi-data/#/2010/scor/>.

¹⁶⁵ "The Failed State Index 2010," No Author, Foreign Policy Magazine, 21 June 2010. Accessed 19 April 2011. Available http://www.foreignpolicy.com/articles/2010/06/21/2010_failed_states_index_interactive_map_and_ranking_s.

original mandate was to restore a secure and stable environment, to promote the political process, to strengthen Haiti's government institutions and rule of law structures, as well as to promote and to protect human rights.¹⁶⁶

In Haiti, a social contract between the state and its citizens is missing; Haitians do not feel entitled to demand respect for their rights or the provision of basic services because of the long history of weak political institutions and inefficient service delivery. Due to this lack of a social contract the ability of private interest groups such as the economic and political elite has increased to influence the political process, exploiting public emotions by breeding further resentment and further compromising the ability of the Haitian state to carry out basic functions effectively and efficiently. This has resulted in a vicious cycle of political conflict, social unrest and the threat of widespread violence.¹⁶⁷

Haiti is a free market economy that enjoys the advantages of low labor costs and tariff free access to the U.S. for many of its exports. Poverty, corruption, and poor access to education for much of the population are among Haiti's most serious disadvantages. It is the poorest country in the Western Hemisphere with 80% of the population living under the poverty line and 54% in abject poverty; the damage to Port au Prince caused the country's GDP to contract an estimated 5.1% in 2010. Two thirds of all Haitians depend on the agricultural sector, mainly small scale subsistence farming, and remain vulnerable to damage from frequent natural disasters, exacerbated by the country's widespread deforestation. U.S. economic engagement under the Haitian Hemispheric Opportunity through Partnership Encouragement (HOPE) Act, passed in December 2006, has boosted apparel exports and investment by providing duty free access to the U.S. markets, Congress voted in 2010 to extend the legislation until 2020 under the Haitian Economic Lift Act (HELP); the apparel sector accounts for three quarters of Haitian exports and nearly one tenth of GDP. Remittances are the primary

¹⁶⁶ United Nations, "MINUSTAH: United Nations Stabilization Mission in Haiti," No Author. Accessed 21 April 2011. Available <http://www.un.org/en/peacekeeping/missions/minustah/>.

¹⁶⁷ Sean Blaschke et al., "Haiti – A Future beyond Peacekeeping," School of International and Public Affairs, Columbia University. Accessed 21 April 2011. Available http://www.sipa.columbia.edu/news_events/documents/UNSPHaitiFinalReport_v42_FINAL.pdf.

source of foreign exchange, equaling nearly 20% of GDP and more than twice the earnings from exports. Haiti suffers from a lack of investment, partly because of limited infrastructure and a lack of security. In 2005, Haiti paid its arrears to the World Bank, paving the way for reengagement with the Bank. Haiti received debt forgiveness for over \$1 billion through the Highly Indebted Poor Country (HIPC) initiative in mid 2009. The government relies on formal international economic assistance for fiscal sustainability, with over half of its annual budget coming from outside sources.¹⁶⁸

Haiti's vulnerability to frequent natural hazards weakens the government's ability to pursue and maintain momentum toward long term development goals. Haiti's natural environment has been severely degraded, with little remaining forest cover, soil erosion and destabilized river catchments. These conditions subject the population to heightened risks from natural hazards. Haiti's economy suffered a severe setback when it was hit by the earthquake, which destroyed much of its capital city, Port au Prince, and neighboring areas. Haiti's economic loss due to the earthquake was about US\$10 billion (84% of GDP) and insured damage was US\$30 million (0.3% of economic loss).¹⁶⁹ The loss of civil servants in the earthquake has weakened the government and added to the challenges already faced by national policy makers.¹⁷⁰

Political stability and the internal law and order situation in the disaster hit country is very important for the freedom of operation for local relief workers as well as attracting relief workers from abroad. It is a major concern for volunteer ICTs because they are usually operating on their own without proper government support and security. Political stability is particularly important to generate trust of the internal and external donors and also to attract volunteer organizations to send their experts and other work force into the country. After a major disaster hits, the internal law and order situation is prone to become even worse due to government agencies themselves being stressed,

¹⁶⁸ CIA, "The World Factbook- Haiti," No Author, Accessed 28 April 2011. Available <https://www.cia.gov/library/publications/the-world-factbook/geos/ha.html>.

¹⁶⁹ Glan C Bruno Et al., "A Vision for Managing Natural Disaster Risks," World Economic Forum, April 2011. Accessed 28 April 2011. Available http://www3.weforum.org/docs/WEF_VisionManagingNaturalDisaster_Proposal_2011.pdf.

¹⁷⁰ Ibid., 100.

government focus on relief activities, the loss of shelter and defense, increased crimes such as theft, shoplifting, robbery and similar reasons. As per the GPI and other analysis of both the countries, it is indicated that Pakistan was suffering from a poor political situation and law and order situation in the country at the time of disaster. Many volunteers who were willing to go there to help people could not go due to deteriorated law and order conditions. Many donors around the world did not have trust in the government to spend of funds for relief and recovery operations in some ways. Haiti could be considered a comparatively stable country in terms of law and order conditions and its government, although not ideal, still did not have as much trust deficit as the Pakistani government had. This factor favored Haiti to influence international community to donate and to come physically in the country to participate in the relief and recovery operations. Participation of a large number of U.S. military elements in the Haiti earthquake relief efforts motivated the whole of the international community to participate aggressively.

The capacity of a country to withstand losses and carry out relief and rehabilitation of affected people due to a major disaster like an earthquake or floods greatly depends on its economical depth. This factor can also enable the victim country to attract loan giving organizations like World Bank (WB) and International Monetary Fund (IMF) for provision of loan to help in coming out of a difficult economic situation. Those organizations are most willing to help countries, which have progressive economies because they can meet their schedule of returning loans as compared to poor states, which generally are unable to guarantee that they can meet their economic targets to clear debt. Pakistan has a much bigger economy than Haiti and is therefore more capable to absorb an economic blow than Haiti and this fact seemed to have favored Haiti in terms of support from governments and public as well. Volunteer organizations also realized that Haiti would not be able to undertake relief and recovery operations and therefore mobilized most of their resources to help Haiti.

The overall impact of internal stability led to the assigning of Haiti a score of '14' and Pakistan a score of '6.'

b. State of Military Forces or Trained Human Resources Available for Rescue and Relief Works

The availability of a trained and equipped professional force to provide response in case of a disaster is a great asset for the country. The effectiveness of the international community, and especially ICT volunteers in the country, greatly depends on the quality of support and coordination provided by the government organizations. Donor support and provision of trained man power during relief and rehabilitation operations is also dependent on how many trained relief workers are available within the country and the state of their preparedness and equipment.

Pakistan has a strong civil service and a strong military, which ranks 8th in the world with extensive experience and a tradition of responding to national disasters. In the case of the 2005 earthquake, the Pakistani army played the leading role in immediate disaster response, and local governments/institutions generally performed well. The Pakistani government immediately set up the Federal Relief Commission to oversee and coordinate all aspects of emergency response (with military and civilian wings). The many international agencies that responded to the Pakistani earthquake worked under the direction of the Pakistani Federal Relief Commission, and often under the military. After the 2005 earthquake Pakistan raised National Disaster Management Authority (NDMA), which works under National Disaster Management Commission (NDMC) headed by the Prime Minister and is tasked to prepare for disaster management and coordinate all relief and recovery operations in case a disaster hits the country. The NDMA played a main role in the conduct and coordination of relief and recovery operations during the 2010 floods. This was the main organization that coordinated and conducted most of the relief and recovery operations by the government. It also coordinated all relief and recovery effort by the UN organizations, foreign country forces, INGOs, NGOs and other volunteers and help direct the relief goods and man power to much needed areas. This organization has worked very effectively in relief and rehabilitation operations during the 2010 floods in Pakistan.

Haiti had no regular military forces and only a small Coast Guard. The police force was augmented by personnel of MINUSTAH and the forces from other

regional countries, which were a great help during the relief operations after the earthquake. The regular Haitian Armed Forces (FAdH) had been demobilized and only existed on paper.¹⁷¹

Pakistan could provide better coordination and support to the international community through NDMA, its military and other local forces. On the other hand, Haiti had the advantage of having MINUSTAH and other regional forces present in the country, which were already settled and knew the situation on the ground. Their strength was increased and they were able to effectively help in the relief and recovery efforts. However, different INGOs and UN organizations were in charge of all operations and no governmental organization could control or coordinate the relief or recovery operations. So, the overall control, support and coordination provided by Pakistani forces was better and helped the international community to reach where they were more needed and disburse aid to places in dire need. For this reason, Pakistan was assigned a score of ‘12’ and Haiti a score of ‘4.’

c. Geographic Location

The geographic location of the disaster hit country plays a very important role in mobilizing the international community, and both the government as well as the public. People, of course, generally care more for their neighboring countries than those far away from them. Also, the terrain of the victim country and climate have an effect on the conducting of relief and recovery operation, especially on the provision of relief work force by the foreign governments, NGOs and ICT volunteers. The relations and level of engagement of a country with the international community is an important factor in mobilizing the international community for financial and physical support for relief and recovery operations in case of a disaster hitting the country. For the most part, the international community responds without much consideration for past relations. For example, Cuba, in spite of not having very good relations with Pakistan, was one of the

¹⁷¹ CIA, “The World Fact book- Haiti,” No Author. Accessed 28 April 2011. Available <https://www.cia.gov/library/publications/the-world-factbook/geos/ha.html>.

major assistance providers during the 2005 earthquake. Still, location is quite significant in determining the level and continuity of response from a number of donor countries for the disaster hit country.



Figure 35. Political Map of Pakistan¹⁷²

Pakistan is located in South Asia with an area of around 803,943 sq. km (310,527 sq. mi), almost twice the size of California. Islamabad is the capital city and other major cities include Karachi (the biggest and most populated city), Lahore (second

¹⁷² “Map of Pakistan,” No author. Accessed 23 April 2011. Available http://www.theodora.com/maps/new9/pakistan_large_map.jpg.

largest city), Faisalabad, Hyderabad, Quetta, Peshawar and Rawalpindi. Politically the country is subdivided into five provinces: Punjab, Sindh, Balochistan, Khyber Pakhtunkhwa (formerly known as the North West Frontier Province or NWFP) and Gilgit Baltistan (GB); the Federally Administered Tribal Areas (FATA), which is composed of seven tribal agencies (Bajaur, Mohmand, Khyber, Kurram, Orakzai, North Waziristan, and South Waziristan) and the Azad Jammu and Kashmir.¹⁷³

It is bordered by Iran, Afghanistan, China, India, and the Arabian Sea. It has had difficult and volatile relations with India mainly due to dispute over Kashmir, long standing close relations with China, and extensive security and economic interests in the Persian Gulf. It expresses a strong desire for a stable Afghanistan. Following the 1979 Soviet invasion of Afghanistan, the Pakistani government played a vital role in supporting the Afghan resistance movement and assisting Afghan refugees. After the Soviet withdrawal in February 1989, Pakistan, with cooperation from the world community, continued to provide extensive support for displaced Afghans. Continued turmoil in Afghanistan prevented the refugees from returning to their country. In 1999, more than 1.2 million registered Afghan refugees remained in Pakistan. Pakistan was one of three countries to recognize the Taliban regime of Afghanistan. International pressure after September 11, 2001, prompted Pakistan to reassess its relations with the Taliban regime and support the U.S. and international coalition in Operation Enduring Freedom to remove the Taliban from power. In 1950, Pakistan was among the first countries to recognize the People's Republic of China (P.R.C.). Following the Sino Indian hostilities of 1962, Pakistan's relations with China became stronger; since then, the countries have regularly exchanged high level visits resulting in various agreements. China has provided economic, military, and technical assistance to Pakistan.

The United States and Pakistan established diplomatic relations in 1947. These relations have seen a number of ups and downs over the years. Due to its geographic location, Pakistan had been an important ally of the U.S. in the Cold War

¹⁷³ U.S. Department of State, "Background Note: Pakistan," No Author, Bureau of South and Central Asian Affairs, 6 October 2010. Accessed 23 April 2011. Available <http://www.state.gov/r/pa/ei/bgn/3453.htm>.

against former U.S.S.R. and joined CENTO and SEATO treaties. After the September 11th attacks in the U.S. Pakistan again became an important ally for the U.S. in the Global War Against Terrorism (GWAT); and in 2004 the United States recognized closer bilateral ties with Pakistan by designating Pakistan as a Major Non NATO Ally.



Figure 36. Map of Haiti¹⁷⁴

Haiti is located between the Caribbean Sea and the North Atlantic Ocean, west of the Dominican Republic, and shares the island of Hispaniola with the Dominican Republic (western one third is Haiti and eastern two thirds is Dominican Republic). Its total area is around 27,750 sq. km, slightly smaller than Maryland.

¹⁷⁴ CIA, "The World Fact book – Haiti," No Author. Accessed 6 May 2011. Available https://www.cia.gov/library/publications/the-world-factbook/maps/maptemplate_ha.html.

The Dominican Republic and Haiti share the island of Hispaniola, but traditionally relations between the two countries have seldom been good. In the nineteenth century, Haiti repeatedly invaded, plundered, and occupied the Dominican Republic. The Dominicans tended to see Haiti as black, African, and uncivilized. Most of the Haitian political exiles often settled in Santo Domingo, Dominican Republic, which they used as a springboard for their partisan activities. A number of Dominican governments had also tried to influence political events in Haiti.

The U.S. declared independence from Britain in 1776, the first to do so in the Western Hemisphere, followed by Haiti, which broke away from France in 1804. But that is where the similarities end. While the American War of Independence was driven by white elite unwilling to continue paying taxes to its colonial masters as one of the many reasons, the Haitian revolution was led by a freed slave, Toussaint Louverture.

The existence of a nation of freed slaves to the south became an inspiration for slaves in the U.S., and a thorn in the side of many southerners who relied on slavery for their economy. The animosity of some of the southern states towards Haiti soured relations between the two nations for decades and played a big part in delaying its official recognition by the U.S. until 1862, fifty eight years after its independence. But Haiti's geographic proximity to the U.S. and its strategic location in the Caribbean sparked the interest of American administrations.

Haiti has the a great advantage of being close to the United States and having great diaspora there, which was instrumental in mobilizing the government and the general public to help Haiti in their time of need. The response from all regional countries was very encouraging and the neighboring country, Dominican Republic, also helped a lot during relief operations in spite of having their differences. The United States was the major contributor in terms of manpower, monetary help from government and donations from the public. Pakistan did get help from all its neighboring countries, especially China and Iran. The United States was also the main contributor of relief and recovery help efforts in Pakistan, but the scale was much less than with Haiti, especially in terms of public donations, which were very meager in the case of Pakistan.

Pakistan's location makes it a very important country in world politics and it played an important role in the past and currently is again in the Global War Against Terrorism (GWAT). Its location and engagement with the world made most of the countries come forward and help during flood relief and recovery operations. So we consider that Pakistan had an edge over Haiti as far as geographic location and engagement with the world is concerned for attracting the international community for help. Therefore we assign Pakistan a score '10.5' and Haiti a score '3.5.'

2. Media Attention

The media coverage of the floods in Pakistan, especially by western media, was very slow and less extensive compared to the Haiti earthquake. In the case of Pakistan floods, there were only 320 broadcast news stories and 730 print news stories within the first ten days of the crisis, and in case of the Haiti earthquake there were well over 3,000 stories by print and broadcast within ten days of the crisis.¹⁷⁵

Some main themes of media coverage in the case of Pakistan floods by local and international media were:¹⁷⁶

- Media coverage was more focused on political rather than the human dimension of tragedy.
- Important sub texts were:
 - Government inaction and incompetence
 - Room created for militant groups to provide assistance and peddle ideology
 - Government insensitivity to plight of people
 - Pakistani floods could further hurt unstable nation as military focuses on aid
 - With flooding, Pakistan focus on fighting terror at risk
 - Pakistan President recognizes floods potential to destabilize nation

¹⁷⁵ Ferris, "Earthquakes and Floods."

¹⁷⁶ "Headlines of various Pakistani and International News Papers," Data provided by Head of Chancery, Embassy of Pakistan, Washington DC during interview on 25 February 2011.

- Slow Pakistan response to flood hurts Zardari
- Pakistan floods: minister says aid won't go to extremists
- Pakistan militants seeking to exploit flood chaos
- Pakistan floods provide political boon to Islamic militants
- World increases flood aid to Pakistan, U.S. worried extremists may benefit from crisis
- Flood brings chaos back to Pakistan's Swat valley
- Is Pakistan heading for a coup?
- Pakistan government on rocky ground amid flooding, terrorism, plummeting economy
- Pakistan floods threaten to wash out U.S. war plans
- Pakistan in political crisis amid allegations of flooding aid corruption
- Pakistan's instability puts army, U.S. on edge

Unfortunately, the international media, especially western and U.S. media, showed disbelief about Pakistan. They assumed the worst to come out of Pakistan due to the floods, like militancy and misuse of donated money. We have seen that the suffering of the Pakistani people had to have a negative political context to be news. It seemed that mere Pakistani pain sometimes does not seem enough. Also, the role of social media did not seem very effective and strong during the crises.

Haiti got great media attention right from the beginning of the earthquake. There were well over 3,000 print and broadcast reports within ten days of the crisis. The media reported the poor state of the people. Some of the media outlets like CNN and New York Times even served in relief capacities by partnering with NGOs and Google to create a unified Haitian people finder. Haiti was used as a test laboratory for many of the modern social media tools like Twitter and Facebook, and these proved very effective in finding relatives and also mobilizing people for help through donations, etc.

Media is a very important tool in the present world to influence the masses and build up their perception of an issue. This tool was unfortunately mishandled and

political issues were highlighted during the disaster, which were not very relevant to the relief and recovery operations. However, the perception about the government and the country of Pakistan that was created among the general public within the country and abroad, adversely affected the donations given by the public, especially in the United States and Western world. So, the effects generated by the media demoralized the international community for helping Pakistan more than it would have with reporting of the event based on purely humanitarian grounds. Therefore, Pakistan was assigned a score of '4' and Haiti a score of '12' based on the analysis of the response shown by the media in both the events.

3. Nature of the Disaster

Earthquakes have killed more people in the last ten years than any other form of natural disaster. Almost 60 percent of the people killed by natural disasters between 2000 and 2009 perished in earthquakes, and comparatively very less died in floods. On the other hand, about 44% of the two billion people impacted by disasters were affected by floods and only 4% were affected by the earthquakes. The earthquakes claimed more lives because earthquakes were sudden and had an immediate impact, while floods could be predicted and their impacts were slow. The area affected by earthquakes is also comparatively small.¹⁷⁷ Both the disasters are accompanied with different types of after effects. Earthquakes normally damage the urban infrastructure, industry, real estate, result in loss of life, and results in the loss of a great number of trained and experienced human resources while also adversely affecting insurance industry, etc. On the other hand, floods mostly affect rural areas and its major victims are agriculture, rail/road infrastructure, industry, livestock, fishery, poultry, and inundation of a large area for longer time results in a large number of displaced people who require continuous support. There is also a great threat of outbreak of waterborne epidemics.

The larger number of casualties generates a greater sympathetic feeling among the public than a slower onset of a crisis with more adverse effects and more people affected. The international community responded more aggressively to the earthquake affected

¹⁷⁷ IRIN Global, "DISASTERS: Earthquakes – the decade's deadliest killer."

population mainly because of more deaths, as compared to a flood like disaster where, although deaths are less, the population affected is much greater in number. Therefore, this factor favored Haiti to attract the international community for the support and help in relief and recovery operations. We therefore assigned Haiti a score of '12' and Pakistan a score of '4.'

4. Temporal Factors

The timing associated with a disaster is a crucial issue because of a number of considerations, such as the state of the budget of countries, NGOs and other relief organizations at that time, weather to be encountered during relief and rehabilitation operations, etc. The sequence of events of that particular disaster as compared to other major disasters occurring in other parts of the world is also very important as this dictates the resources left within the international community, including countries, NGOs and ICT volunteers and their level of participation in the relief and rehabilitation operations.

No major disaster occurred in 2009 in any part of the world, so when Haiti was hit by the earthquake in January 2010, most of the countries, UN organizations, INGOs, ICT volunteers and general public, especially in the United States and Western countries, had maximum resources available to participate in the relief and recovery efforts. The international community participated in all forms in the Haiti relief and recovery efforts very generously, which exhausted many of their resources. When Pakistan suffered heavy floods in the months of July – September 2010, the international community had already exhausted most of their resources in Haiti and was therefore left with limited stocks and energy to participate in the relief and recovery operations. Fresh funding from countries and the public, which was not readily available, therefore delayed the response by the international community. The month of January being the start of the year when Haiti was hit by the earthquake allowed the general public to donate generously, especially the Americans who had more money to donate because they had started to receive tax returns and therefore had some extra money to donate, which was not possible in the months when Pakistan floods occurred.

We consider that the timeframe of the occurrence of the earthquake in Haiti afforded the international community more flexibility to exert their resources and energy in the form of manpower participation as compared to Pakistan. Therefore we assigned Haiti a score of ‘12’ and Pakistan a score of ‘4’ based on the effects of the relative timings the disasters had on the response shown by the international community.

B. OVERALL RESPONSE BASED ON COMPARING ALL VARIABLES

The overall response based on our discussion of all the variables is presented in Table 13 and shown in Figure 37.

Variable	Weighting 'N' (1:Least significant to 10:Most Significant)	Pakistan	Haiti
Stability of the government	10	6	14
State of the military forces or trained human resource available for rescue and relief works	8	12	4
Geographical location	7	10.5	3.5
Media Attention	8	4	12
Nature of the Disaster	8	4	12
Temporal Factor	8	4	12

Table 13. Values Assigned to each Variable for Both Countries

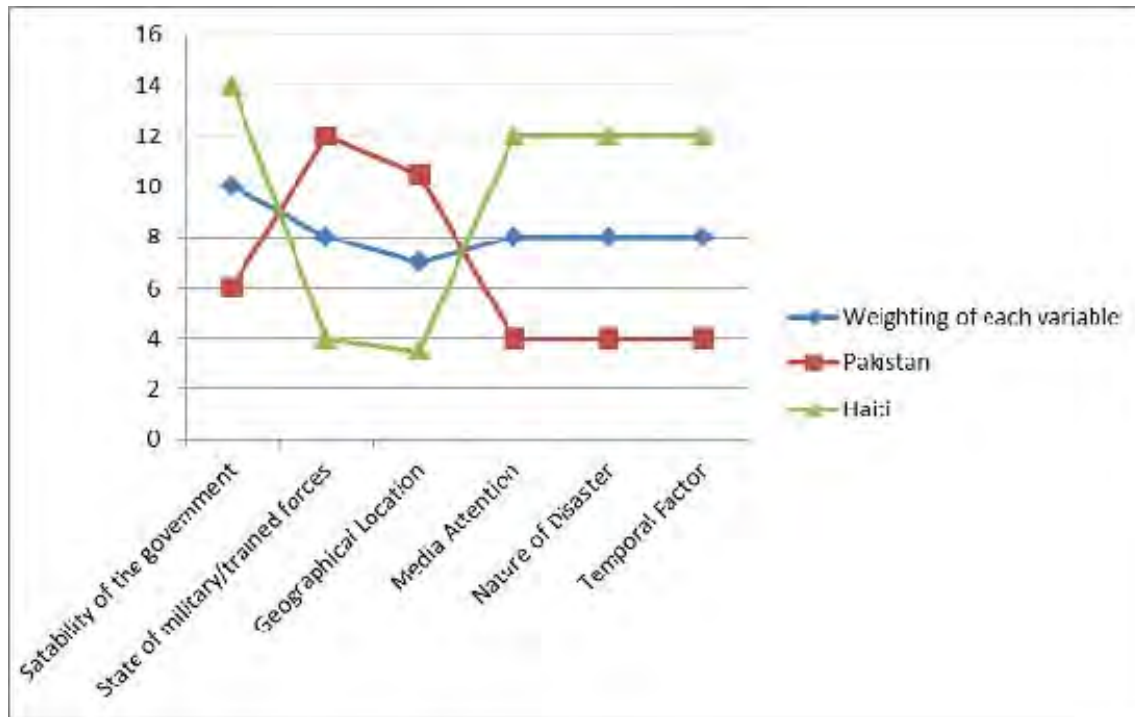


Figure 37. Comparison of Values Given to Both Countries for each Variable

Statistical Analysis		
	<i>Pakistan</i>	<i>Haiti</i>
Mean	6.75	9.583333
Standard Error	1.470544117	1.872684
Median	5	12
Mode	4	12
Standard Deviation	3.602082731	4.58712
Sample Variance	12.975	21.04167
Kurtosis	-1.55423391	-1.78495
Skewness	0.864143607	-0.84131
Range	8	10.5
Minimum	4	3.5
Maximum	12	14
Sum	40.5	57.5
Count	6	6

Figure 38. Statistical Analysis of Variables

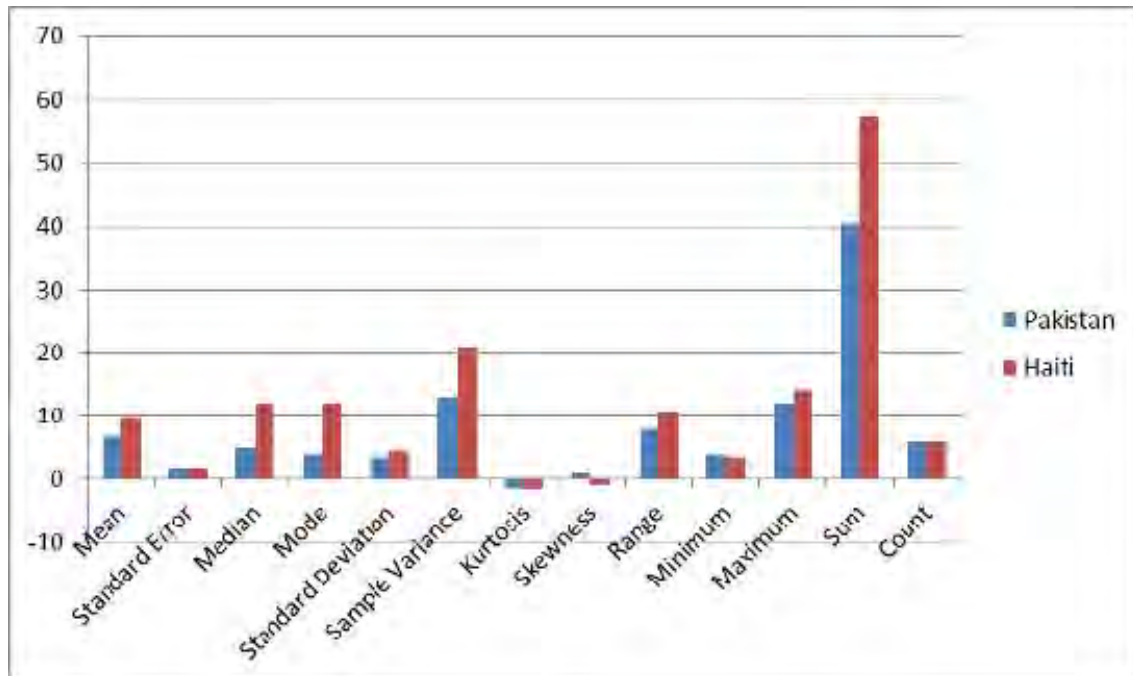


Figure 39. Plot of Statistical Analysis of Variables

Statistical analysis of the values assigned to all variables for both countries as shown in Figure 38 indicated that the response shown by the international community was not equitable in the compared cases. The analysis determined that the response by the international community to the Haiti earthquake was better than it was to the Pakistan floods.

The next chapter will conclude the discussion by exploring what the specific reasons were for this difference in response by the international community and will also present some recommendations to improve and make it equitable.

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VI. CONCLUSIONS

Humanitarian assistance provided by the international community in a major disaster may be considered a lifeline for any country, whether it is a developed one like Japan or Australia or a developing/poor country like Pakistan or Haiti. It is particularly significant for poor or developing countries whose own infrastructures are not capable of dealing with immediate effects and subsequent relief and recovery operations in case of a major disaster. The Pakistan floods in later half of 2010 and Haiti earthquake in January 2010 were exemplar cases to study the differences in the response by the international community and propose measures both to improve the response and address the inequity. The main objective of this research was to propose measures to make the HA/DR response by the international community equitable in case of any disaster occurring in any country regardless of conditions discussed in earlier chapters.

A. WHY THE INTERNATIONAL COMMUNITY RESPONSE WAS DIFFERENT IN PAKISTAN AND HAITI

The international community showed comparatively more aggressive, timely and comprehensive response in case of the Haiti earthquake than the Pakistan floods, both by governments and the public. Within ten days of the onset of the crisis, the international community pledged \$495 per person to the victims of the Haiti earthquake, and in contrast only \$3.20 were committed per flood affected person in Pakistan.¹⁷⁸ The potential reasons for this difference in the response by the international community were:

- The flooding in Pakistan received minimal and non dramatic print and TV news coverage relative to Haiti and other humanitarian disasters. The media did not cover the Pakistani floods as a top story or cause for alarm. There were well over 3,000 stories by print and broadcast media by day ten during the Haiti earthquake crisis, while in case of the Pakistan floods

¹⁷⁸ C. Christine Fair, "Averting Our Eyes: The Shameful International Response to Pakistanis' Sufferings," 16 November 2010. Accessed 27 March 2011. Available http://www.huffingtonpost.com/c-christine-fair/averting-our-eyes-the-sha_b_784325.html.

there were only 320 broadcast news stories and 720 print news stories.¹⁷⁹ Media coverage of the deaths and horrific injuries in Haiti was widespread along with other images of destruction. In the case of the Pakistan floods, the media coverage was focused more on political rather than the human dimension of the tragedy. The local media kept highlighting the internal political issues, corruption among government high ranks and security issues; it failed to create realization among the local populace and people abroad regarding the scale of disaster that was occurring.

- International media continued targeting Pakistan for its alleged ties with militant groups like Haqqani network, Lashkar-e-Taiba and the Afghan Taliban. It also created a sense of distrust among the general public in the U.S. and the West about the judicious use of aid and created fear that the aid provided to the country may fall in the hands of militant groups.
- One of the popular storylines was that the Islamist militant groups will help if the world does not. The fact was that the contributions by the Islamic militant groups to the crisis were more hype than reality, as there were only twenty nine camps being run by Islamic groups compared to more than 5,000 camps run by the government.¹⁸⁰ There was thus a competing narrative that polluted or corrupted the humanitarian issue particularly in the U.S. and western countries, who are major donors in case of a disaster, and this resulted in a much slower and shallow response from the public as well as the humanitarian relief organizations to make donations in terms of cash and relief goods for flood affected people in Pakistan.
- The Pakistani leadership failed to make the scope of destruction and the urgency of the need clear to the donors from the international community. The political leadership in Pakistan particularly failed to show the world the seriousness of the flood crises. President Zardari's visit to Europe at a

¹⁷⁹ Ferris, "Earthquakes and Floods."

¹⁸⁰ Fair, "Averting Our Eyes: The Shameful International Response to Pakistanis' Sufferings."

time when the country started to feel the effects of the floods was highly criticized throughout the world and was considered an example of his government's non seriousness to the issue. On the other hand, when Haiti was hit by the earthquake. its president declared the situation in his country as "unimaginable" and requested help from the international community, which was heard with sympathetic ears across the world.

- Pakistan was facing severe security crises at the time the floods occurred in the country. Pakistan, particularly the flooded areas, had a global reputation for being dangerous. A number of volunteers who otherwise wanted to visit the country to participate in relief and recovery efforts did not go there due to security issues. In Haiti there was not such security issues for individuals and therefore quite a large number of volunteers and volunteer organizations participated in the HA/DR operations after the earthquake.
- One of the feelings among the international community was that it has had to repeatedly bail Pakistan out of various compounding crises. Pakistani political elites, who are mainly wealthy landlords or industrialists, have always resisted any tax reforms, which would generate revenue for the country through implementing taxes on agriculture land or business and always preferred to raise revenue through regressive sales taxes that mostly punish the poor. Secretary of State Hillary Clinton stated "It's absolutely unacceptable for those with means in Pakistan not to be doing their fair share to help their own people while taxpayers in Europe, the United States and other contributing countries are all chipping in."¹⁸¹
- The international community was reluctant to help the flood victims in Pakistan due to the fact that Pakistan's territory had been used by militants groups responsible for launching attacks against the U.S. and NATO forces in Afghanistan. Also, the numbers of Pakistani Americans or Pakistani Europeans involved in terrorist activities in the United States and

¹⁸¹ Fair, "Averting Our Eyes: The Shameful International Response to Pakistanis' Sufferings."

the Europe have left the international community apprehensive about Pakistan.

- Unlike Haiti, Pakistan has one of the world's largest militaries. The availability of military strength was considered an asset and the international community likely believed that the country was quite capable of handling the crises and so they contributed less in terms of work force. But there was also a concern among the international community about the suspected use of donated money by the military for furthering its strength. These factors, coupled with other stories, had an adverse effect on the international community to help Pakistani flood victims.
- Another reason the international community was hesitant to give to flood relief efforts was because of alleged widespread corruption across the government and fears that moneys sent would be diverted into the pockets of Pakistan's corrupt minions rather than the displaced, homeless, food deprived millions. There is a great trust deficit existing between government, its own populace and the international community, which was evident by the meager donations in the President's Flood Relief Fund. Most of the local people preferred to donate through NGOs and the international community also preferred to channel aid through NGOs and UN agencies rather than the Pakistan government.¹⁸²

¹⁸² Fair, "Averting Our Eyes: The Shameful International Response to Pakistanis' Sufferings."

- Haiti received timely and aggressive response from the government and public of the U.S. due to its location being closer to the U.S. and also its important geographic location in the Caribbean. Due to being in close proximity to the U.S., many civic groups could simply collect relief items and travel to Haiti on their own. Moreover, the presence of a large number of Haitians and Haitian Americans living in the U.S. (around 1.7 million as of 2010)¹⁸³ generated considerable interest in responding while the corresponding number of Pakistanis living in the U.S. (approximately 349,685 as of 2008)¹⁸⁴ was much lower and they could not play a similar role.
- One of the reasons for the slow pace of donations by the international community for flood victims in Pakistan was likely due to the nature of the disaster. Floods are slow building disasters, which have less loss of life and are therefore harder to gain sympathy of people away from the scene and to raise money for the victims. The rising flood waters don't trigger the same sense of urgency and alarm as an earthquake that demolishes buildings and kills hundreds of thousands of people in a few seconds. The relatively low number of deaths due to floods in Pakistan compared with the Haiti earthquake was undoubtedly a factor, as was the nature of the injuries suffered. The New York Times' Neil MacFarquhar described the floods as not being as sufficiently "dramatic, emotional and telegenic" as the earthquakes and tsunamis that so opened

¹⁸³ The Haitian Diaspora Federation, No author. Accessed 10 July 2011. Available <http://www.myhdf.org/the-Haitian-Diaspora.htm>.

¹⁸⁴ U.S. Census Bureau, "United States: S0201, Selected Population Profile in the United States, Pakistani alone or in any combination, Data Set: 2008 American Community Survey," No Author. Accessed 10 July 2011. Available http://factfinder.census.gov/servlet/PTTable?_bm=y&-context=ip&-reg=ACS_2008_1YR_G00_S0201:045;ACS_2008_1YR_G00_S0201PR:045;ACS_2008_1YR_G00_S0201T:045;ACS_2008_1YR_G00_S0201TPR:045&-qr_name=ACS_2008_1YR_G00_S0201&-qr_name=ACS_2008_1YR_G00_S0201PR&-qr_name=ACS_2008_1YR_G00_S0201T&-qr_name=ACS_2008_1YR_G00_S0201TPR&-ds_name=ACS_2008_1YR_G00_&-tree_id=306&-redoLog=false&-geo_id=01000US&-search_results=01000US&-format=&-lang=en.

American wallets.¹⁸⁵ Floods have been described as slow motion disasters that cannot be effectively conveyed in a single photograph or piece of video.

- By most accounts, Haiti, prior to the January 2010 earthquake, enjoyed relative internal stability. The government was relatively stable and working with approval from the public and people had confidence that the government was going to stay for its legitimate duration. The government of Pakistan, on the other hand, was faced with internal stability challenges; the government was surviving one after the other predicted fall. The political coalition partners had differences with the government on major issues at various times and left the coalition, which led to predictions that it will fall soon but it somehow managed to get them back in the government or was able to get support from other political groups and could manage to avoid its fall. But the public generally did not believe that the government would be able to complete its tenure due to its incapability to control corruption, inflation, unemployment and other issues.
- Presence of MINUSTAH personnel prior to the earthquake in Haiti was helpful in triggering UN response more aggressively just after the earthquake hit the country. Its strength was increased and mandate was extended to participate in relief and recovery operations.
- Large scale involvement of U.S. Southern Command provided great trust among the INGOs and other volunteers to get involved in the relief and recovery efforts. The U.S. Southern command was only focused in Haiti towards earthquake relief operations. It used all its assets for earthquake relief operations and restoring/building infrastructure within the country, and therefore all its press releases and conferences were focused on the earthquake. This focused and aggressive media projection of the

¹⁸⁵ Neil MacFarquhar, "U.N. Sounds Alarms on Aid for Pakistan," The New York Times , 17 August 2010, Accessed 21 May 2011. Available <http://www.nytimes.com/2010/08/18/world/asia/18nations.html>.

earthquake relief activities motivated the general public within the U.S. to give more donations for the victims and relief operations. Whereas in case of Pakistan, U.S. Central Command was already engaged in two wars and its main focus was on those wars. It did not spare many of its resources for flood relief operations and therefore its presence in the relief operations was not prominent, and therefore the public in the U.S. and the west did not see in the media many U.S. assets involved in the flood relief activities. Therefore it could not generate the same type of effect among the public to motivate them for more donations, which was generated by U.S. Southern Command's involvement in Haiti. It was an occasion, which could have been used to show U.S. support for the government and public of Pakistan by more and more flags showing in the relief operations in terms of helicopters, vessels, relief goods, men or whatever means possible. The U.S. was undoubtedly the major relief provider in the floods relief operations, but considering its resources that could have been very easily mobilized from Afghanistan and role of Pakistan in war against terrorism, it could have done much more to win the hearts of many Pakistani people, and this could have helped the Pakistani government and U.S. agencies to further isolate the extremist elements in the country.

- August is a vacation season in the U.S. and most of the West, when many people pay less attention to the news. One of the reasons that general public from the U.S. and western countries did not follow the onset of Pakistan's flood tragedy on the media, which was already late in reporting the exact scale of the disaster, was this vacation season when people were away from their homes and were not regularly watching or reading the news. For example, during this season even new TV episodes in the U.S. are suspended as many people stop watching them due to vacations.
- Pakistan lacked Haiti's network of Western charities. As a result, it lacked Haiti's preexisting network of Christian humanitarian organizations and missionaries that have been in the country for decades. Those Christian

missionaries in Haiti, predominantly Americans doing a combination of religious and humanitarian work, were so important because they could use American churches as a vast grassroots network to communicate Haiti's plight to Americans and especially to raise money. But Pakistan has no such large scale, long term presence of these charities, which could raise a voice to the general public in the West and the U.S. to ask them to donate to its flood victims.

B. RECOMMENDATIONS

The experiences in both Haiti and Pakistan highlighted the importance of taking preemptive measures to save more lives and effectively mitigate the effects of natural disasters. It is a fact that earthquakes, monsoons and other natural disasters cannot be prevented by human actions, but countries can take actions that may help to decrease the risk to their populations. The importance of Disaster Risk Reduction (DRR) has long been recognized as an important hallmark of good development planning and reconstruction process, but unfortunately it has been generally harder to generate both political and donor support for long term mitigation measures than for immediate response to disaster victims. It is evident that DRR measures save lives. For example, during the 2001 Bhuj earthquake in India, most government buildings that conformed to construction codes suffered only limited damage, while schools and hospitals that did not follow the codes completely collapsed. When Cyclone Sidr struck in November 2007, an estimated 3.2 million Bangladeshis were evacuated from the coastal areas and over two million were already in special shelters when the cyclone hit. About 4,000 Bangladeshis died, compared with around 140,000 in a similar cyclone in 1991 and up to 500,000 in 1970. Therefore, it is very important to have a disaster risk management as an integral part of the government administration in all countries. An organizational construction to enable more effective HA/DR response is the primary recommendation.

1. Proposed Disaster Management Organization

A proposed model organization as described in Figure 40 may be considered by all the countries to prepare for disaster risk management and to undertake relief and recovery operations in an effective and well coordinated manner. This model organization may be considered as a macro level organizational guideline for countries, NGOs and UN organizations to prepare a comprehensive organization based on a respective country's local conditions, needs, resources, and other such factors. The goal here is to have an organization for every country that could provide better coordination of HA/DR operations amongst all the involved actors both from local and international community.

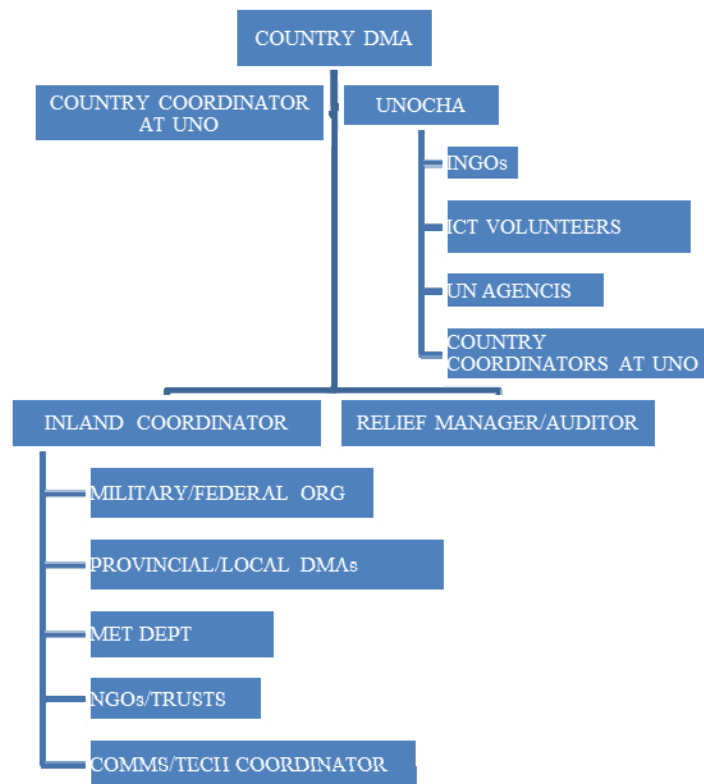


Figure 40. Proposed Organizational Model for Disaster Management Authority

The proposed duties and responsibilities of each tier in the above model organization are described below.

a. Disaster Management Authority (DMA)

We propose that United Nations Organization (UNO) should pass a resolution to bind all member states to have a Disaster Management Authority (DMA) as an integral part of its administration at the national level. This authority may be responsible to the head of the country for overall preparation and conduct of HA/DR operations. The DMA should exercise overall coordination and control responsibilities over all organizations, which are involved in the preparations for disaster risk reduction and also those, which are involved in relief and recovery operations after a disaster hits the country. To perform its functions the DMA should be assisted by a Country Coordinator at UNO, UNOCHA, Inland Coordinator and a Relief Manager/Auditor. Through these controllers the DMA will be able to use all resources, those available from within the country and those provided by the international community, more effectively and in an organized and well coordinated manner. Some of the DMA's functions may include ensuring measures taken to avoid any disaster that can be avoided, should prepare work force to mitigate after effects of a disaster, should ensure acquiring of machinery, tools and materials needed for conduct of HA/DR operations, should enforce measures to reduce effects of disasters such as enforcing proper building codes, strengthening of river/canal banks, etc., and should also prepare master plans for relief and recovery operations in case of all possible disasters the country may be prone to face.

b. Country Coordinator (CC) at UNO

Each member state should have a country coordinator designated at UNO who is to assist the DMA in coordinating overall HA/DR operations with the international community. This country coordinator should have all the records of his country's vulnerabilities from certain well known disasters the country is prone to, should help the DMA in preparing national plans to carry out relief and recovery operations in consultation with experts from UNO and other related people from the international community and locals, should have worked in advance with DMA a list of requirements that his country would need from international community in case of a particular disaster hits his country, and should have detailed record of resources his country can provide to

the international community for HA/DR operations in any other country. The country coordinator at UNO may be made responsible for making available its country's resources and capabilities for helping in relief and recovery efforts in case of disasters hitting other countries and also presenting his country's requirements at UNO in case his own country is hit by a disaster. This coordinator may have worked out in advance what expected disasters his country may suffer are and what resources available with his country to conduct relief and recovery operations are, and should also have pre-hand information available for short term and immediate requirements that are to be provided by the international community. He can then in the meantime work out midterm and long term requirements his country requires to be met by international community.

c. United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA)

UNOCHA may assist the DMA in coordinating relief and recovery efforts provided by all UN agencies, INGOs, ICT volunteers and other elements of the international community. It should assist the DMA with help of other organizations such as World Bank (WB) and The Asian Development Bank (ADB), etc., in accurate damage assessment and launching appeals for relief and rehabilitation from the international community. It should also work closely with country coordinator at UNO and relief manager/auditor to assist them in performing their functions and ensuring transparency in relief and cash disbursement and spending. Due to its expertise and experience, UNOCHA may help the DMA much more in all areas of HA/DR operations and DRR efforts.

d. Inland Coordinator (ICoord)

An inland coordinator should be responsible for coordinating and managing inland resources and ensuring their optimal utilization and control. He should exercise control over designated federal/military personnel, local meteorology department, provincial/local DRMs, communication/technical coordinator and local NGOs/trusts and other local elements involved in the HA/DR operations in any respect to help the DMA in achieving his objectives in preparing for and conduct of relief and

recovery operations in a disaster. Federal and military personnel assigned for participating in the HA/DR operation may be functioning under the control of the DMA through a designated commander from the military, all provincial/local governments should have their disaster management organizations and plans ready and coordinated with the DMA, for better communication set up and provision of required technical assistance in HA/DR operations inland coordinator should have a comms/tech coordinator working under him. He should also coordinate all the effort of local NGOs and charities for their effective application and even distribution to all affected areas. A meteorology department should also be responsible to the inland coordinator for updates on weather and other information leading to any disaster. The UNO may also work that all meteorology data specially that leads to the prediction about development of a major weather anomaly is shared within all member states, so predictions may be used to better prepare for and fight a disaster and to save maximum lives.

e. Relief Manager/Auditor (RM/A)

A relief manager/auditor may be appointed by the UNO to assist the DMA in accounting for all the relief provided from within the country and by the international community and may also be conduct audits throughout the relief and recovery process for ensuring transparency in collection and distribution of relief goods as well as cash donations. A relief manager may work under the DMA to account for all relief made available through all resources and to do continuous audits that it is being used in the right way. He may be appointed by the UNO so that there should be a sense of satisfaction for all individuals and organizations that their donations and funds are being used properly.

This organizational construct is mainly designed to address the issue of coordination among different elements involved in the HA/DR operations, transparency in use of funds provided from within and the country and from abroad for relief and rehabilitation operations, to have data available for asking or offering help in case of a disaster, and to achieve minimum readiness level in advance of suffering from a disaster. To achieve redundancy the different elements of this model organization, which are

stationed within the country, may be dispersed to different locations preferably away from each other, so that in case of one location being hit by a disaster, the other elements remain available to conduct relief operations. It may be considered to have a standby for those nodes at different locations, so that whole organization remains intact with all its elements in case of a disaster happening at any location.

2. General Recommendations

The following are recommended measures considered to be important in improving the response of the international community in an HA/DR operation conducted at any part of the world:

- The local community's ability to respond to any type of disaster should be strengthened, because they are in the best position to save many more lives than any other organization that has to be mobilized after a disaster hits a particular place. It also requires comparatively much less funding than deploying other local and international assets that are very expensive.
- Every country must be responsible for preparation, updating and online availability of its street level mapping in a variety of formats for use by relief workers. ICT volunteers and other concerned international organizations may provide all possible help to achieve this goal. There may also be legislation at UNO to limit the use of such open street maps for humanitarian purposes only to address the concerns of certain countries that these maps may be used for military purposes against them.
- The media needs to have a consensus on a code of conduct to be followed about a country, which is hit by a disaster. It may be considered to highlight more of the humanitarian side of the crisis than any political issues. Although there may be genuine political and administrative issues with the concerned country, these issues may not be reported in a manner that these have adverse effects on the humanitarian response from the international community. For example, in many countries live reporting of terrorist or crime incidents is not done due to its value for the terrorists

and disadvantage for law enforcing agencies. In the similar manner, it may be considered to focus more on the humanitarian crisis if a country is suffering from a disaster than other issues like corruption, bad governance, political disputes, etc. Moreover, the media has many information experts who may tell people alternatives available for humanitarian assistance in case the country has a really bad government and cannot avoid reporting it. The media can really play a great role in directing the people's sympathies and donations for relief and rehabilitation efforts. Media may educate the people that all humans feel pain when they are suffering from a disaster regardless of their location and political or other issues and they need help.

- Governments have to ensure transparency in their system of relief distribution and funds disbursement for motivating people to donate directly to the government's funds. This will help in avoiding overhead cost when funding private organizations or NGOs, which is in most cases more than 45% of total donations collected. Also, too many private organizations get involved, which poses additional administrative and coordination problems. Like in Pakistan flood case, due to confusion and organizational constraints, the UN used only two thirds of more than the \$1 billion it raised for relief because too many agencies and charities had been brought in.¹⁸⁶ In a case where the victim country had an organization similar to the proposed model organization, all elements could have taken control of their respective areas of responsibility and every organization/element would have known in advance its tasks. All resources available and provided could have been used more effectively and judiciously. The UNO appointed relief manager/auditor could have been used to ensure transparency in the distribution of relief goods and funds. It could have been instrumental in strengthening the confidence of

¹⁸⁶ BBC News, "Britain criticizes UN Pakistan Flood Response," No author, updated 10 May 2011. Accessed 16 May 2011. Available <http://www.bbc.co.uk/news/world-south-asia-13343378>.

public, charity organizations and governments in transparent use of their donations and could have motivated them for much more donations and help.

- The nature of the disaster is a very important consideration to gain the sympathies of the international community. In the case of an earthquake, there is normally much more loss of life than compared to floods where people affected are comparatively much more, but a greater number of casualties normally motivate people to donate much more. The media may play an important role in educating people that those who are dead in an earthquake do not need much of the rehabilitation efforts, but those who are injured need help. In fact the number of deaths and injuries in an earthquake are immediately visible and highlighted, which gets the attention of most of the people and they donate generously for them. Whereas floods are generally a slow moving disaster, which normally affects a greater number of people than an earthquake, these effects are not very visible. Floods last for a longer duration, a lot of people are displaced who lose shelters, livestock, infrastructures and earnings/jobs. They not only need help to survive the floods but continuous support afterwards for a longer time to be able to restore their normal life activities.
- There should be a treaty signed by all member states of the United Nations to share weather prediction and data regarding the onset of disaster in any part of the world so that if there is a prediction about the buildup of a disaster by any country that is shared with the victim country. The victim country has information from all countries capable of weather or other natural disaster predictions and then it may decide on actions to be taken. In the case of the Pakistan floods, computer models at a European weather forecasting center, European Centre for Medium Range Weather Forecasting (ECMWF), were giving clear indications that the heavy downpours were imminent. If the information had been processed, heavy

rainfalls leading to the floods could have been predicted around 8 – 10 days beforehand.¹⁸⁷ If this was the case, a great number of lives lost in the initial phase of floods could have been spared and better preparations might have been done.

- After the Haiti earthquake there emerged three different loosely connected communities of interest, which included the U.S. government, the United Nations and the international community and Information Communication Technologists (ICT) Volunteers. They all collected, shared and used great amounts of digital information through a variety of web portals, platforms and social networking media, such as Short Message Service (SMS) feeds, Twitter and Facebook. Each community has their priorities and requirements and therefore it should be worked out that critical data and information should be structured in such a way that it can be shared across communities, networks and platforms. The databases thus prepared and made available can serve all actors involved in the humanitarian operations to get help in their respective field.¹⁸⁸ The governments should support the continued use of these databases and make their best use in the conducting relief and rehabilitation operations more effectively.
- Essential baseline geospatial datasets should be stored, backed up and shared in advance so that they can be used immediately once a disaster occurs. Likewise, geo referenced datasets that are collected during the immediate response/relief phase of a disaster should also be stored and maintained so that they can be used for planning and analysis during the subsequent reconstruction and recovery phases.
- New ICT tools and information systems may be introduced to the public and relevant people involved in HA/DR operations may be trained in their use in advance of emergencies, so that these technologies can be utilized

¹⁸⁷ Anthony Watts, "Pakistan floods last summer could have been predicted," 1 February 2011. Accessed 5 May 2011. Available <http://wattsupwiththat.com/2011/02/01/pakistan-floods-last-summer-could-have-been-predicted/>.

¹⁸⁸ King, "The Haiti earthquake: breaking new ground in the humanitarian information landscape."

fully and effectively when a disaster occurs. Tools and technologies that are interoperable, nonproprietary, no/low cost, self contained, easy to access and easy to use are the most effective.

- It may be ensured that critical data and information is preapproved for release and is sharable with the host government, civil society and affected population in local languages to strengthen host country capacities, leverage local expertise, gain their input, involve them in coordination and empower them.
- In order to keep up with the latest technology innovations and new management practices, the international humanitarian community should engage with the private sector and academic institutions because they are increasingly donating funds, equipment and volunteers to humanitarian response efforts. This should be done both systematically and continuously.
- In earthquake prone regions strict earthquake safe building standards should be implemented and ensured. This not only entails the use of stronger, more resilient building materials, but also the development of strong institutions that can enforce safe building standards. The infrastructures may be made more redundant by making more roads, backup generators, water reservoirs, or fuel reserves and communications systems for emergency warnings with backup systems, etc., which are key in making civil services more robust to disasters.
- For effective use of social media, it may be ensured that a redundant infrastructure is needed to support the internet after a disaster occurred in the country. In the case of Pakistan's floods most of the people had no chance to access the internet due to lack of necessary infrastructure in affected areas. And while generators were used to recharge mobiles in Haiti, a flood more than a meter high, such as in Pakistan, would have likely flooded all generators, making them useless even if the internet

service was available in the affected areas.¹⁸⁹ Therefore, it may be useful to widely distribute small portable solar powered nodes to small communities, which may be used to recharge a laptop and number of cell phones that may be used by the people to share their status with the relatives and make calls for any help needed to the concerned authorities or relief workers. Governments may consider installing generators 1 – 2 meters above the ground in flood prone areas so that these may be used to provide energy to essential resources such as lighting, or pumping drinking water, etc., in the event of floods.

- Pakistan government should consider inviting and facilitating the international charity organizations to develop their setup in the country. These organizations may act as a bridge between the local public and the international community and are therefore very useful to establishing social contacts and project the true image of the nation worldwide as these generally operate globally. These organizations are particularly very helpful in motivating the international public for donations and gathering help in case of any disaster happening in the country as they enjoy great support and trust by the people in most cases.

C. PROPOSED AREAS FOR FURTHER RESEARCH

The HA/DR challenge is an ever existing phenomena. It is only in the near past and the present, due to the world becoming a global village because of interconnecting communication tools, that it has been possible to have institutionalized technological preparation and response to disasters by the local and international community. Therefore, this is a topic that has a lot of dimensions to be explored to improve it and make it help humanity throughout the world. However, some of the areas that can be explored are:

¹⁸⁹ Urs E. Gattiker, “Twitter in Crises: 6 Tips for a Faster Rescue,” 18 April 2011. Accessed 18 April 2011. Available <http://commetrics.com/articles/2011-trends-in-social-media-usage-during-disasters-and-emergencies/>.

- The proposed model organizational structure may be studied in depth for its viability and capability to resolve interagency coordination and functionality issues among different organizations and agencies involved in the HA/DR operations.
- The role of social media may be studied for its effectiveness in the relief and rehabilitation efforts. Efforts to understand how best to employ or use it in poor or developing countries in the aftermath of a major disaster should be undertaken.
- Volunteer built technologies made a visible difference in Haiti relief and recovery efforts. Technologists who work outside humanitarian operations and volunteer their time could build applications that can help conduct the relief and recovery operation in a more coordinated and effective ways. It should be worked out by humanitarian agencies to figure out how to make best use of them rather by government fiat.

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